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The Nature of Socioeconomic Status among Young Adults in the U.S., and its Effect on Health: A Multi-Group SEM Analysis by Gender and Race/Ethnicity

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The Nature of Socioeconomic Status among Young Adults, and its Effect on Health: A Multi-group SEM Analysis by Gender and Race/Ethnicity

by

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The Nature of Socioeconomic Status among Young Adults in the U.S. and its Effect on Health: A Multi-group SEM Analysis by Gender and Race/Ethnicity

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This dissertation focuses on results of multi-group SEM models estimated using data from the National Longitudinal Study of Adolescent Health (Add Health) in order to determine appropriate measurement and structural models for the relationship between socioeconomic status (SES) and health among six young adult U.S. social groups. Examining the links between SES and health during young adulthood is important because while there is a strong, documented link between lower SES and poorer health (Adler & Snibbe, 2003), young adults can exercise a considerable amount of agency with regard to their own SES and health. Young adults make critical decisions about pursuing post-secondary education, entering the workforce, and practicing healthy behaviors--activities which differ in their immediate and long-term economic and health payoff (Mirowsky & Ross, 2003; Elder, 1985; 1994). Yet, the nature of SES and its links with health for members of various gender and racial/ethnic groups is not entirely clear. Literature suggests that occupation, education, and income are neither defined nor linked among women in the same ways that they are for men (APA, 2007). Self-assessment of health is also thought to differ by gender and ethnicity (Krause & Jay, 1994). Moreover, limited research has addressed the unique mediating

pathways by which aspects of SES affect health for specific social groups (Matthews, Gallo, & Taylor, 2010). In this work, I estimate measurement models for several aspects of SES among African American, Latina, and White men and women, then link aspects of SES with each other and with health using structural equation modeling. I also examine the unique mediating pathways by which aspects of SES are linked with health for these groups.

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Chapter 1: Introduction

Since ancient times, there has been a strong, documented link between higher SES and better health (Krieger, Willains, & Moss, 1997; Liberatos, Link, & Kelsey, 1988; Lynch, Kaplan, Cohen, Tuomilehto, & Salonen, 1996). For example, in adulthood, lower SES is associated with poorer physical and mental health outcomes, including higher rates of cardiovascular diseases, arthritis, disability, diabetes, chronic respiratory diseases, cervical cancer, schizophrenia, substance abuse, and anxiety (House et al., 1992, 1994; Williams & Collins, 1995; Adler & Snibbe, 2003).

Yet, young adulthood is a key period in the life course when individuals can exercise a considerable amount of agency with regard to their own SES and health. That is, young adults are making critical decisions about pursuing post-secondary education, entering the workforce, and practicing healthy behaviors. These activities differ in their immediate and long term economic and health payoff (Mirowsky & Ross, 2003; Elder, 1985; 1994). For example, while young adults who pursue higher education postpone immediate financial reward, they later receive it at a compounding rate once they achieve their additional credentials (Mirowsky & Ross, 2003). Higher levels of educational attainment positively affect health across the life course because they are linked with greater monetary earnings, the development of skills and habits that increase productivity in future jobs, the ability to manage income more effectively, and the securing of jobs that offer better medical benefits. Higher levels of income also makes certain life events, such as childbirth, less stressful (Elder, 1994).

Health, too, is cumulative across the life course. Individuals with higher levels of SES are better able to secure good food, shelter, and health care; and to avoid environmental toxins, poor sanitation, and situations that foster a fight-or-flight stress response—all of which contribute to better overall health over time. Those with higher levels of SES also experience greater levels of perceived control (APA, 2007; Mirowsky & Ross, 2003), which influences one's outlook on the ability to control one's behaviors, including health behaviors (e.g., exercising daily) and problem-solving behaviors (e.g., taking the bus instead of walking late at night). These behaviors, over time, promote health and prevent/delay the onset of disease, disability, and harm. On the whole, SES-related exposures and behaviors manifest themselves in health "stocks," that is, biological accumulations of health, including body fat, aerobic capacity, blood pressure, artery buildup, bone density, and allostatic load.

Yet, the nature of SES and its link with health for members of various gender and racial/ethnic groups is not entirely clear. For one, traditional indicators of SES (occupation, education, and income) are linked with each other and with psychological mediators in different ways for different groups. For example, on average, African Americans earn less income for the same level of education, compared to Whites; the same is true for women compared to men (Muhammad, Davis, Lui, & Leondar-Wright, 2004; APA, 2007). Moreover, members of various gender and racial/ethnic groups garner a sense of perceived control, an important mediator between SES and health (APA, 2007; Adler & Snibbe, 2003; Mirowsky & Ross, 2003), from different sources. For example, White men and women have been shown to draw a sense of perceived control from

higher levels of income and from being married, while Black men and women draw a sense of perceived control instead from higher levels of education (Bruce & Thornton, 2004).

Moreover, the link between SES and health has often been described as "mysterious," with researchers and theorists pointing out that the effects of SES on health take place not just through poverty or lack of health care, but through understudied psychological mediators (Angell, 1993; Adler et al., 1994; Adler & Snibbe, 2003; Kaplan & Lynch, 1997). For example, formal measurement of perceived SES, one mediator between SES and health, is relatively new, dating back only to 2001 (Social Ladder of Subjective Social Status; Goodman et al., 2001). As such, little work has examined how mediating paths involving perceived SES might differ by social group. The same has been said about financial strain. While increased financial strain is one pathway by which economic circumstances are thought to affect health outcomes, little work has focused on how various social groups might interpret economic circumstances differently and not experience financial strain in the same way (Price, Choi, & Vinokur, 2002).

Because young adults are making critical decisions that affect the rest of their adult life—decisions that provide or limit future options, including those relating to SES and health—young adulthood is a critical period for the study of SES and health. Studying the link between SES and health at this point in the life course in structural models estimated among various social groups addresses several important gaps in the literature. It sheds light on the unique ways that aspects of SES are linked with psychological variables and with health for members of distinct social groups, and

reveals indirect pathways that unravel the "mystery" of how SES has its effects on health (Angell, 1993).

To address these gaps in the literature, this dissertation focuses on the following goals: (1) describing the nature of various aspects of SES among young adults of different gender and racial/ethnic groups; (2) examining how these aspects of SES relate to each other and to self-rated health; (3) examining the mediating roles of psychosocial variables frequently related to SES and health—financial strain, perceived SES, and perceived control; and (4) examining whether the relationships between aspects of SES and health among young adults persist when potentially confounding variables are added to the models.

Chapter 2: Defining and Measuring Socioeconomic Status

Lester Ward offered the term "socioeconomic" in 1883 (Jones & McMillan, 2001). Since then, there has been considerable disagreement on how to conceptualize and measure SES (Oakes & Rossi, 2003; Campbell, 1983; Rose, Pevalin, & Elias, 2001). For over 125 years, scholars have debated the theory, operationalization, and usefulness of SES constructs (Campbell, 1983; Oakes & Rossi, 2003). Some have suggested eliminating the idea of an SES construct altogether (Krieger et al., 1997), though many disagree, arguing that SES is a conceptually useful way of measuring access to resources (Oakes & Rossi, 2003).

Approaches to SES

According to the APA (2007) models of SES can be generalized into three main types: material and structural approaches, gradient approaches, and class approaches. *Material approaches to SES* focus on the attainment of goods and services such as education, health care, and access to information and social resources, as a function of quantifiable characteristics such as income (APA, 2007). In this conceptualization, SES is often quantified using formulas that take various amounts of occupation, education, and income into account (see Grusky, 2001). Social scientists working from this framework continue to disagree on how best to operationalize SES, such as which indicators are the most valid, and which indicators should be combined into aggregates. For example, one combination of indicators might be that a college degree plus a corporate position equals middle class (APA, 2007).

Gradient approaches to SES conceptualize SES as a continuous variable and focus on disparities—differences between an individual or group's position in relation to that of other individuals or groups (Adler & Snibbe, 2003; Kawachi, & Kennedy, 1999; Lynch, Harper, Kaplan, & Smith, 2005). Gradient conceptualizations of SES, like material conceptualizations, are usually anchored by traditional, objective indicators of occupation, education, and income. In support of the gradient conceptualization, much research has focused on the effect of income inequality in particular countries and states on health outcomes (e.g., Wilkinson, 1996; Kaplan, Pamuk, Lynch, Cohen, & Balfour, 1996). For example, for the health outcome of mortality, researchers often find that countries and states with greater income inequality have higher mortality rates.

Class approaches to SES emphasize the persistent reproduction of hierarchies of power and privilege, where social class inequality is a form of social and political dominance that allows some groups to prosper at the expense of others (e.g., political elites and corporate owners over workers). In this approach, social inequality is not only conceptualized in terms of differential access to resources but as "the structural re-creation of privilege and the fusion of wealth and power, particularly in capitalist societies" (APA, 2007, pp. 6-7). The class approach to SES moves away from the psychological tradition of focusing on the individual, and instead places emphasis on structures and institutions that perpetuate social class inequality (Bourdieu & Passerson, 1977).

Some researchers combine two or more of these perspectives in their conceptualization of SES. For example, Oakes and Rossi (2003) explain that some

researchers, such as Krieger et al. (1997), consider prestige and status (representative of a class approach) as distinct from material goods (representative of a material or gradient approach). In contrast, Oakes and Rossi (2003) do not consider prestige and status as separate from material goods, instead arguing that prestige and rank-related characteristics give access to consumption of goods, services, and knowledge. They state that their position is not new, but that it has been articulated by many others through the years of SES conceptualization and re-conceptualization—for example, by Nock and Rossi (1979), who explained that SES translates objective distribution of resources into meaningful perceptions of desirability; by Coleman (1990), who linked actors with resources through interests and control; by Hauser and Warren (1997), who articulated that SES is shorthand for variables that categorize individuals, families, and neighborhoods according to their capacity to consume valued goods (see also Wohlfarth, 1997).

Measurement of SES

Lack of clarity on the definition of the SES construct has resulted in disagreement on how to measure it (Hauser & Warren, 1997; Krieger et al., 1997), resulting in a "cottage industry" of SES scales (Rose & Pevalin, 2001). The majority of SES measures have consisted of items related to occupation, education, and income. Each of these indicators of SES has been discussed and debated as to the best way to measure it, and how it should be combined with other SES indicators into an overall SES index. For example, each of these indicators can be measured dichotomously (employed vs. unemployed, high school diploma vs. no high school diploma, poverty status vs. no

poverty status) or continuously (ranked occupation, years of education, dollars earned; Oakes & Rossi, 2003). Further, scales have differed in terms of how many of these indicators are combined into the index (only two, or all three indicators). Finally, scales have differed in terms of how these indicators should be averaged into an overall index. Often, researchers have crudely averaged scores on occupation, education, and income items, rather than relying on sound psychometric techniques to determine how these items should be differentially weighted in creating a construct that predicts a specific outcome (Oakes & Rossi, 2003; Nunnally & Bernstein, 1994; Streiner & Norman, 1995), or how they should be differentially weighted for various social groups (e.g., gender, race). A number of combinations of SES indicators have been proposed, each with its own orientation toward SES components. Table 1 displays a review of SES scales that have been proposed through the years of SES research.

Table 1

Review of SES Measures

Name of Scale	Creator (Year)	Country of origin	Components	Description	Acclaim / Popularity	Flaws
Registrar General's Social Class (RGSC) scale	Stevenson (1913), cited in Oakes & Rossi (2003)	Great Britain	Occupation	Occupations of household heads classified into a small number of levels by "expert" Census workers	First widely-appreciated measure of SES	
expansion of Stevenson's work	Edwards (1917, 1938)	U.S.	Occupation	Expanded the previous 4 U.S. Census occupational classes to 10 (from the 428 in the 1910 Census) and conducted analyses on their correlates		American researchers thought that Census data was conceptually restrictive, and that empirical study of single, small communities would be better.
Community-based SES measures	e.g., Lynd & Lynd (1929); Warner (1949); Hollingshead (1971)	U.S.	Household status	Community members' ratings of households located households in a hierarchy. Assumed that everyone in a small community knows its status hierarchy and can rank most people in it.		

Table 1 (cont'd)

Living Room Scale	Chapin (1935)	U.S.	Household possessions	This scale was an exception to the community approach to SES popular at the time. This scale conceptualized SES as a latent construct, ranking families according to the items in their living room.	
National Opinion Research Center Survey	Cecil C. North and Paul K. Hatt of the National Opinion Research Center (1947), cited in Oakes & Rossi (2003)	U.S.	Occupation	Respondents to a national sample survey rated 90 occupations according to social standing. Averages formed "prestige scores," reflecting societal consensus of the status of each occupation.	Critics, esp. ecially British sociologists, questioned the use of prestige scores because they were "subjective" (Nam & Terrie, 1982; Warren, Sheridan, & Hauser, 1998).
Measurement of occupational "status" as a function of educational attainment and income	American stratification researchers, e.g., Featherman & Hauser (1976); Nam & Powers, 1965)	U.S.	Education, Income	SES was defined and measured using only "objective" SES characteristics with face validity: education and income. Occupational prestige was seen as epiphenomenal. Educ. was seen as the requirement for an occupation, with income seen as the reward of occupation, from the investment put into educ.	Some American researchers (e.g., Hodge, 1981; Rossi & Berk, 1987) argued that subjective indicators should remain central to SES measures because they reflect societal norms.

Table 1 (cont'd)

Index of Social Prestige (ISP)	Hollingshead (1971, 1975); Hollingshead & Redlich (1958)	U.S.	Occupation, Education	Hollingshead's (1949) community survey gave rise to a three-factor SES scale for a mental health epidemiologic study of New Haven, CT; then to a two-factor (occupation, education) scale for more general use. Occupation estimated the "skill and power an individual possessed"; education estimated "cultural tastes" (Hollingshead cited in Haug & Sussman, 1971). Factor scores were combined into a weighted sum, then divided into quintiles across persons.	Never published in a peer-reviewed journal, but has enjoyed modest success in American psychology (cf. Mueller & Parcel, 1981).	The ISP has been criticized harshly for its methodology, and was quickly considered out-dated (see Haug & Sussman, 1971).
Socioeconomic Index (SEI)	Duncan (1961)	U.S.	Occupation	Occupations were classified according to educ. and inc., reasoning that education is a prerequisite for occ. and inc. is a reward. Duncan showed that income and education explained 83% of the variance in occupational prestige, concluding that occ. prestige can be predicted for any individual with a measured inc. and educ.	Perhaps the most widely known and used American SES scale; has had many updates (e.g., Hodge, Siegel, & Rossi, 1964; Nakao, Hodge, & Treas, 1990; Stevens & Featherman, 1981).	(1) Occupation may not be the dependent variable when considering occ., educ., and inc. (2) SES has a richness not captured in educ. and inc. (e.g., Powers, 1982). (3) Duncan's data analysis was criticized as being flawed.

Table 1 (cont'd)

Occupational Status Scores (OSS)	Nam & Powers (1965)	U.S.	Education, Income	OCC scores were calculated for all U.S. Census occupations from median education and income levels, which were selected as indicators because: 1) they are "objective", 2) they are available in most data sets, and 3) each reflects a different aspect of stratification. Components were weighted equally, given no basis for differential weighting (Nam & Terrie, 1982, p. 38). The scale ranged from 0 to 100, with a mathematical interpretation: the percentage of persons in the civilian labor force who are in occupations having average levels of education and income below that occupation (Powers, 1982). Nam and Powers also developed an OCC score for members within a family.

Table 1 (cont'd)

Health behavior scale	Green (1970)	Occupation, Education, and Income	Occupation, education, and income were combined into a composite that maximally correlated with health behavior in a statewide sample of California families with at least one child less than five.		The main criticism of the scale was that it does not measure SES itself, but predicts health behaviors which correlate with SES (see Mueller & Parcel, 1981). Its ideal use is for health screening and behavioral analyses.
Household Prestige (HHP) Scale	Rossi, Sampson, Bose, Jasso, & Passell (1974)	Occupation , Education, and Ethnicity	Rossi et al. assigned HHP scores to households—a more aggregate unit than individuals. Using his factorial survey approach Rossi & Anderson, 1982), a convenience sample of Whites in Baltimore were asked to rate the social standing of households portrayed in vignettes where husband's occ. and educ., wife's occ., and ethnicities were randomly varied. Regression coefficients reflected the relative influence of vignette characteristics on status rating, and can be used to predict status in other samples.	Nock and Rossi (1979, 1978) applied the same method to national samples, though this approach has not received widespread Attention (see citation in Oakes & Rossi, 2003)	

Table 1 (cont'd)

Standard International Occupational Prestige Score (SIOPS)	Treiman (1975)		Occupation	Scores were based on data from 55 national studies on occupational prestige. The innovation here was the use of multinational data.	Treiman's approach is one of the few available to cross-national researchers interested in industrialized societies.
	Wright (1985)	U.S.	Degree of control over investments, decision making, other people's work, and one's own work	This measure categorized persons according to theoretically-derived, Neomarxist class categories having to do with means of production and exploitation. The scale was constructed based on data from a representative U.S. telephone sample. The short version of the scale has only four questions and is very practical for survey use (see Krieger et al., 1997; Wohlfarth, 1997).	

Table 1 (cont'd)

Cambridge Scale (CS)	Prandy (1990)	Great Britain	Occupation	The CS aimed to overcome problems of the "intuitively developed" Registrar General's scale and its derivatives, attempting to base the measure on social theory rather than subjectivity. To develop the CS, survey respondents were asked to name the occupations of four friends, whose rankings were then analyzed with multidimensional scaling techniques that yielded a continuous (ordinal) scalar CS score for each respondent.

Table 1 (cont'd)

National Statistics Socioeconomic Classification (NS-SEC)	Rose & O'Reilly (2001)	Great Britain	Occupation	The NS-SEC relies on employment theory and groups persons into typically eight nominal (not ordered) classes or strata. Lack of concern with occupational ranks reflects British sociologists' concern with occupational relationships, not hierarchies.

Occupation as an indicator of SES. There are several key points to be made about the conceptualization and measurement of occupation as an indicator of SES: (a) the distinction between employment, occupation, and work; (b) how and by whom occupations are ranked, and (c) whether occupational rankings are too "subjective" or dependent on societal opinions to truly measure SES at all. First, social scientists have distinguished between employment, occupation, and work. *Employment* refers to a set of mutually exclusive and exhaustive categories: employed full-time, employed part-time, keeping house, retired, unable to work because of disability, temporarily unemployed or laid off, in school, in the military, or in an institution (a prison or asylum; Mirowsky & Ross, 2003). These employment statuses differ in their stability over time, with some statuses tending to be more transitional than others, such as temporarily laid off. Individuals with jobs or looking for jobs are considered to be part of the "labor force." *Occupation*, then, refers to a social classification of paid work based on the level of respect and esteem ascribed to them, with ratings largely determined by the average education and earnings for a certain job (Blau & Duncan, 1967). "Occupational status," referring to this relative prestige of one's job, is not to be confused with "employment status," which is based on labor force participation, hours worked per week, and reasons for unemployment. Finally, some have highlighted the difference between a job, something performed in return for pay, and *work*, an activity directed toward production or accomplishment.

Theorists have proposed many bases for ranking occupations, including degree of skill involved (e.g., the Registrar General's Scale commonly used in Great Britain;

Stevenson, 1928); average education and income associated with the job (e.g., the Hollingshead Index of Social Position); prestige (O. D. Duncan, 1961); and access to capital and production, including power status at the job—for example, whether a person is an owner, a supervisor, or a worker (see the measures used by Erikson and Goldthorpe in Great Britain and by Erik Olin Wright in the U.S.; Wright & Perrone, 1977).

Further, scales including occupation as an indicator have differed on who has ranked the occupations. For example, for Stevenson's (1913) Registrar General's Social Class scale (RGSC), occupations of British heads of households were classified into a small number of levels by "expert" Census workers (cited in Oakes & Rossi, 2003). In contrast, for the National Opinion Research Center Survey (1947), occupational ranks were given by respondents to a national sample survey of the U.S., forming prestige scores that reflected societal consensus of each occupation. Other scales have included race as a factor when asking respondents to rank occupations. For example, Rossi et al.'s (1974) Household Prestige (HHP) Scale was based on ratings given by a convenience sample of Whites in Baltimore of the social standing of households portrayed in vignettes where husband's occupation and education, wife's occupation, and the ethnicities of the characters were randomly varied. Other scales have based occupational scores on ratings of occupational prestige in as many as 55 countries (Treiman, 1975), or have tried to simply classify occupations into nominal categories, eliminating the problem of ranking altogether.

Finally, many theorists and researchers have pointed out that occupational rank is not an objective or proper indicator of SES because the status of a job reflects changing

social norms and is thus subjective (Nam & Terrie, 1982; Warren et al., 1998; Featherman & Hauser, 1976; Nam & Powers, 1965). That is, occupational rank is usually based on societal consensus of what occupations are "prestigious" at a particular point in time (Oakes & Rossi, 2003). To address this concern, some SES scales have purposely removed occupation as an indicator of SES; for example, American stratification researchers Featherman and Hauser (1976) and Nam and Powers (1965) considered occupation inferior to education and income as an indicator of SES, as well as redundant, since they viewed education as the requirement for an occupation, and income the reward of occupation. On the other hand, later American researchers argued that subjective indicators of SES should remain central to SES measures (e.g., Hodge, 1981; Rossi & Berk, 1987).

Education as an indicator of SES. Two key themes in the conceptualization and measurement of education as an indicator of SES have been: (a) human capital versus credentialist models of education; and (b) quality vs. quantity of education. Models of education that conceptualize education as adding to human capital generally account for education in terms of years and assume that there are continual benefits to additional years of education attained (Montez, Hummer & Hayward, in press). However, researchers have found that the effects of educational attainment on health and achievement outcomes are not always continuous. Instead, researchers often find discontinuity in the effects of education on outcomes, with "jumps" in the amounts of positive outcomes attained at the years at which degrees are conferred. This is referred to as a "sheepskin" effect (Backlund, Sorlie, & Johnson, 1999; APA, 2007; Montez et al., in

press). Sheepskin effects of education on outcomes occur because credentials mark not only that the individual has gained additional skills and knowledge, but that they are judged more positively by others, have expanded social resources, are exposed to higher expectations, and may have had the extra perseverance needed to achieve a degree (Hungerford & Solon, 1987). Some researchers have thus recommended including both years of education and highest degree attained, simultaneously, in models involving education (APA, 2007).

Further, others have emphasized that effects of *quantity* of schooling and degree obtained are not the same for all people, but depend on the *quality* of the schooling. That is, a degree from an inner city high school may not be equivalent to a degree from a college preparatory program. Private kindergartens and high schools can cost well above $10,000 per year to attend. These elite schools give students not only a better education, but more valuable social networks and greater access to prestigious colleges, highlighting that the U.S. schooling system hardens class structure by institutionally segregating children by class (APA, 2007). This has led some researchers to incorporate measures of school quality—typically measured in percent students above grade level, graduation rates, or percent of teachers with a graduate degree—when using educational attainment as an indicator of SES.

Income as an indicator of SES. Last, discussion about the conceptualization and measurement of income as an indicator of SES have centered on the question of whether the measure assesses income, poverty, or wealth—and the implications of each of these. *Income* in the U.S. generally refers to the dollars earned by a household, implying a

continuous measure of SES that is affected by employment status and occupational status. According to Huston, McLoyd, & García Coll (1994), income reflects an individual's, family's, or group's ranking on a hierarchy according to their access to or control over valued commodities such as status and power (Mueller & Parcel, 1981). Measures of income can include personal earnings, spousal earnings, both personal and spousal earnings, or total household income (which can include additional money received from other family members; APA, 2007). Source of income (self's, spouse's, or both) is an important consideration given that, historically, women's health outcomes have been determined more by their husband's socioeconomic characteristics than her own (Marmot, Shipley, & Rose, 1984; Marmot et al., 1991). Income can be affected singular events such as job loss and divorce, but it is not based on an absolute threshold.

In contrast, *poverty* can be defined as lacking the means to provide for one's physical well-being, including basic needs of food, clothing, shelter, and care (Mirowsky & Ross, 2003), based against an absolute threshold. According to Huston and colleagues, poverty reflects a pervasive stressor—a conglomerate of conditions—not a singular event such as a cut in income (Huston et al., 1994; Huston, McLoyd, & García Coll, 1997). However, because it is measured against an absolute standard or threshold, it can be more volatile than measures of income. For example, children who have lived in poverty differ in the *chronicity* of this poverty, or amount of time spent in poverty (Huston et al., 1994). While some children spend their youth in persistent and chronic poverty, other children come from families at the cusp of the poverty line, and experience only intermittent poverty, with cognitive and behavioral problems more likely for the former than the

latter. According to Huston and colleagues, poverty can be considered simultaneously with other indicators of SES (such as income) because each has a unique effect on children's development.

Poverty status is generally indicated in the U.S. by comparing one's income against a standard set by the U.S. Department of Health and Human Services that takes family size and inflation into account (U.S. Department of Health and Human Services, 2011). It was originally based on the estimated cost of food in a very basic diet, multiplied by 3. Because this calculation does not reflect how far below (or above) the poverty threshold a family is, some researchers choose to assess poverty using a *family income to needs ratio* that indicates amount (or depth) of poverty or affluence (Huston et al., 1994). In calculating a family income to needs ratio, family income is divided by the threshold set for a particular family size in a particular year, yielding not simply a dichotomous marker of falling above or below the threshold, but a proportion. Some researchers have pointed out that because poverty status is based on a national standard, it does not take regional differences in food prices into account. Others have critiqued that there is subjectivity in what is even considered a "need" (Ravallion, 2008). Despite these critiques, poverty status is a useful way to measure a family's ability to provide for basic needs of food, clothing, shelter, and care (Mirowsky & Ross, 2003), and is an important predictor of children's outcomes (Huston et al., 1994).

Finally, *wealth*, also referred to as assets, is a separate but related measure of SES, defined as private assets minus debts; it can include tangible goods such as a home or a car. According to Alan Greenspan, former chair of the Federal Reserve Bank, wealth

differs from income because it represents not just dollars earned, but the ability of households to consume (Greenspan, 1998, quoted in APA, 2007, p. 2). Having non-monetary assets, such as owning a house or a car, have been linked to better health outcomes and, according to some researchers, may have associations with health outcomes independent of income (Kington & Smith, 1997; Robert & House, 1996). Others have shown that wealth can buffer the effects of income fluctuations, and argue that it is a better indicator of position on the SES ladder than a single measure of income (APA, 2007). Wealth can also include what is transferred intergenerationally from parents or grandparents to children. Because most wealth for African American and Hispanic families is held in the form of housing, racial differences in wealth are even worse than those for income (APA, 2007; Altonji, Doraszelski, & Segal, 2000; Conley, 1999; Oliver & Shapiro, 1995).

Critiques of the Traditional Occupation-Education-Income Model of SES

Though most measures of SES have utilized a tripartite occupation-education-income approach to defining and measuring SES, several substantive critiques have been raised and reiterated about the inferiority of this oversimplified approach. Many of these critiques have been summarized in the work of Aletha Huston (e.g., Huston et al., 1994; Huston et al., 1997) and also in a recent Task Force Report published by the APA (2007).

One critique has been that the understanding and modeling of SES should take a life course perspective (APA, 2007). As mentioned, the life course perspective refers generally to the interweave of age-related trajectories with changing conditions, short-term transitions, and future options (Elder, 1985; 1994). Because it is typical for children

and adolescents to not yet have their own occupation and income, and have not yet completed their education, youth are usually are not yet thought to possess their own SES, so parental indices of SES are often used in substitute (Liu, Friedman, & Hall, 2008). It is not until young adulthood that individuals' own occupation, education, and income are used as indices of their SES. This is not to say that SES is not meaningful for children. Even at birth, SES is a strong predictor of health outcomes, including infant mortality (Adler & Snibbe, 2003). Likewise, childhood SES experiences have been shown to have persisting effects across the lifespan, including their effects on adult health outcomes (Adler & Snibbe, 2003; Repetti, Taylor, & Seeman, 2002).

In addition to this difference in the use of parent's SES as a proxy for childhood SES, SES affects health differently, and through different mechanisms, at various points in the life course. For example, low SES may affect a child's psychological health if she is teased for not wearing trendy clothes, or for eating school-provided lunches (APA 2007; Bradley & Corwyn, 2002; Brooks-Gunn & Duncan, 1997). In adolescence, low SES is associated with risky behavior and exposure to violence, which are harmful physically and psychologically (G. J. Duncan & Brooks-Gunn, 2000). Among adults, the link between low SES and health is often associated with occupation, with unemployed persons exhibiting higher rates of depression (APA, 2007; Luther & Becker, 2002; Price et al., 2002). This link may be more meaningful for certain U.S. subpopulations, including Mexican American men, for whom the link between unemployment and depression has been attributed to a diminished sense of productivity, self-worth, and masculinity (Apesoa-Varano, 2010). This link between unemployment and depression

among adults has been the basis for encouraging civic engagement as a tool for enhancing emotional health among older Americans (Herrera, 2010). Across the lifespan, then, we see that low SES affects health in unique ways related to one's developmental needs and activities. Further, the impact of low SES on health tends to depend on the length and timing of the socioeconomic condition (Bradley & Whiteside-Mansell, 1997; Duncan & Brooks-Gunn, 1997; Miller & Korenman, 1994).

Proponents of the life course perspective emphasize that models of socioeconomic status should be sensitive to the specific, age-relevant outcome that a researcher is trying to predict or explain. This approach was taken by Lawrence Green years ago in his 1970 health behavior scale, in which he created SES scores that combined measures of occupation, education, and income into a composite that maximally correlated with health behavior. He was criticized for this approach at the time, with some arguing that Green's scale did not measure SES itself, but only predict health behaviors—behaviors which correlate with health (Oakes & Rossi, 2003; Mueller & Parcel, 1981). More recently, however, Green's scale has been credited as ideal for health screening and behavioral analyses, being acknowledged for its specificity and practical use.

Next, it has been strongly recommended that SES models be sensitive to social identity. Instead of controlling for race and ethnicity in models of SES-related processes, researchers should acknowledge that race and social class cannot be separated in the context of the U.S. (Huston et al., 1994). For example, African Americans earn less income for the same level of education, compared to Whites; the same is true for women compared to men (Muhammad et al., 2004; APA, 2007). APA (2007) has rearticulated

this need for a critical perspective on SES, pointing out SES has a nuanced meaning for each individual (see also Delgado & Stefancic, 2001; McCall, 2005). This nuanced meaning of SES is also seen in work demonstrating that occupation, education, and income are not correlated to the same magnitude for members of different social groups, putting to question crude averaging of these components in creating SES indices. For example, Chen, Langer, Raphaelson, and Matthews (2004) found in their study of SES and health among adolescents that occupational and assets-based measures of SES were highly and significantly correlated for Caucasian participants at r =.54, while these were unrelated for African American participants at r = .08.

Additionally, several lines of research have demonstrated that subjective SES is important to include in predictive models of health, even more important than objective SES predictors (Adler, Epel, Catellazzo, & Ickovics, 2000; APA, 2007; Hodge, 1981; Rossi & Berk, 1987). For example, subjective SES predicts various physical and mental health outcomes including waist-to-hip ratio, heart rate, and psychological distress (including depression and negative affect), even when controlling for objective SES (Adler et al., 2000). Among the elderly, subjective SES is a better predictor of their ability to handle disabilities than objective SES criteria (Matthews, Smith, Hancock, Jagger, & Spiers, 2005).

Finally, many SES theorists have urged for the use of psychometric techniques in developing valid and appropriate models of the effects of SES (Jones & Cameron, 1984; Krieger et al., 1997; Liberatos et al., 1988; Oakes & Rossi, 2003; cf. Nunnally & Bernstein, 1994; Streiner & Norman, 1995). In 2003, Oakes and Rossi conducted a meta-

analysis of the studies in the major and minor publications in the fields of sociology, psychology, and economics that have focused on the relationship between SES and health, or on the measurement of SES. They found that while the number of articles focusing on the relationship between SES and health increased dramatically from 1990 to 1999, very little work has been dedicated to SES operationalization and measurement. They compared this with the proportions of topical and measurement-related articles on depression, and found that in the depression literature, topical and measurement articles were reasonably matched in proportion.

I acknowledged these critiques in exploring the SES-health relationship among young adults in this dissertation by being targeting a particular segment of the life course (young adulthood), estimating models separately by gender and racial/ethnic group rather than controlling for these social variables, and including subjective aspects of SES and psychological correlates of SES in my models. To ensure that my modeling was also psychometrically sound, I relied on nationally representative data, with thousands of participants, to estimate structural equation models (SEMs) of SES and health in both exploratory and cross-validation samples of data. That is, I explored the measurement of SES and the relationships between components of SES and health in one half of the data, and cross-validated these measurement and structural models in a second half.

Chapter 3: The Relationship Between SES and Health

Health can be defined according to one of the following descriptions: "soundness of body" (Oxford English Dictionary, 2000), "the overall condition of an organism at a given time; soundness, especially of body or mind; freedom from disease or abnormality; a condition of optimal well-being" (American Heritage Dictionary of the English Language, 1992); "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (WHO; World Health Organization, 2000); or "the state of the organism when it functions optimally without evidence of disease or abnormality; a state of dynamic balance in which an individual's or a group's capacity to cope with all the circumstances of living is at an optimal level" (Stedman's Medical Dictionary, 2000). Measures of health can be *clinical*, which are diagnostic and specific to certain health conditions, or *social*, which are more general and usually involve the respondent's *perception* of symptoms (Mirowsky & Ross, 2003), the latter of which was used to measure health in this dissertation.

Self-rated Health

One of the most frequently-used social survey indicators of health status is *self-rated health*, or *subjective health*. Usually, self-rated health measures consist of one item asking respondents to rate their overall health as excellent, poor, fair, or poor (Krause & Jay, 1994). The rating is as inclusive as the respondent chooses to make the assessment of his or her health. This captures the psychosocial nature of health, and aligns with the WHO's conceptualization of health as global, encompassing physical, mental, and social well-being (Idler & Benyamini, 1997). The benefit of using self-rated health as a measure

of health in social surveys is that it is concise and global. Its brevity makes it easy to incorporate into interviews and questionnaires, and its inclusiveness allows it to do the work of many questions about specific symptoms and signs (Mirowsky & Ross, 2003).

Measures of self-rated health have been shown to have good validity and reliability. Validation research indicates that a self-rated health item principally measures physical health problems and, to a lesser extent, mental health problems; responses reflect many aspects of health, including general well-being, energy levels, being free from discomforts, functional ability or impairment, and various types of diseases (Mirowsky & Ross, 2003; Davies & Ware, 1981). Scores on self-rated health have been shown to correlate highly not only with more objective measures of health but also with physicians' ratings of overall health (Mirowsky & Ross, 2003). Reports of subjective health also have remarkably high reliability for a single item. According to Mirowsky and Ross (2003), responses to typical survey questions have a reliability of around .3, but responses to subjective health items have a reliability of around .58. This tells that people are generally able to report their overall state of health with relatively little random noise.

Response Styles for a Self-rated Health Item by Social Group

According to Krause and Jay (1994), respondents use various frames of reference in answering a self-rated health question. For example, most of Krause and Jay's sample of respondents, drawn from three cities in the Midwest region of the U.S., answered a self-rated health item using one of the following standards as their frame of reference: presence of health problems (25%), absence of health problems (22%), or general/nonspecific health matters such as mobility (23%). Smaller portions of the

sample based their self-rated health on specific behaviors, such as maintenance of a good diet or exercising (13%), or on comparisons with other people (6%). Krause and Jay (1994) also state that personal assessment of health is shaped to an extent by one's identification with a particular social group. For example, these researchers discussed that frames of reference used in global self-assessments of health may differ according to age, level of education, gender, and race/ethnicity. To the extent that individuals in these groups differ in the weight or value places on certain dimensions of health, global self-rated health scores will also differ.

Specifically, with regard to age, younger members of Krause and Jay (1994)'s sample (aged 14-24) relied more on specific health *behaviors* as their frame of reference, while members of their sample who were in middle and older adulthood (ages 25 to 59, and ages 60 and over) relied more on health *problems* as their frame of reference. Krause and Jay (1994) noted that older people may be more likely to think of health in terms of health problems because they are more likely than younger individuals to experience chronic health problems. Interestingly, those with lower levels of education in their sample tended to use health behaviors as the referent for their self-rated health, though Krause and Jay had expected less educated respondents to rely on health problems as their referent, similar to older respondents, because lower levels of education are generally associated with greater health problems.

Research suggests that perceptions and report of health also differ by gender. Studies have consistently demonstrated that women use more health care services than men, and are more likely to seek help for prevention and illness (Cleary, Mechanic, &

Greenley, 1982; Hibbard & Pope; Verbrugge & Wingard, 1987; Bertakis, Azari, Helms, Callahan, & Robbins, 2000). Several explanations have been offered for these findings, including that women generally have higher rates of morbidity than men, have greater medical needs related to reproductive biology (Waldron, 1983; Mustard, Kaufert, Kozyrsky, & Mayer, 1998; Gijsbers van Wijk, Kolk, van den Bosch, & van den Hoogen, 1992), and are more likely to be referred for medical care by physicians (Bertakis et al., 2000). However, studies have shown that men are referred to specialty care more often than women (Franks & Clancy, 1997), and hospitalized men are more likely than women to be referred for invasive cardiac procedures (Ayanian & Epstein, 1991; Giles, Anda, Casper, Escobedo, & Taylor, 1995).

These differences in health care utilization match with findings about men and women's typical responses on a self-reported health item. Research shows that distributions of responses for a self-rated health item do not differ for men and women (U.S. Department of Health and Human Services 1995), and that men and women seem to refer to the same criteria in rating their health (Krause & Jay, 1994). However, poor ratings among men are usually more predictive of mortality than are poor health ratings among women (Idler & Benyamini, 1997). According to Idler and Benyamini (1997), women tend to experience more nonfatal chronic and acute conditions. Among women, a poor self-rated health score may reflect poorer self-judgments in light of a lifetime of more prevalent, but acute health problems, or reflect comparisons with other women, who also experience frequent health problems. Among men, on the other hand, a poor self-rated health score may reflect a more serious condition.

Contemporary research on health also tends to emphasize that health is socially constructed within each culture. For example, Whitfield (2009), a leading scholar on biobehavioral and social aspects of health disparities, has explained the issue of "claiming" a sickness in African American communities, in which a person is not said to "have" a sickness until they "claim" it. In other words, it is a difference between being sick and accepting the sickness as part of one's identity, and proceeding to seek care. Likewise, others have emphasized that understanding of self-rated health among Latino immigrants depends on how long a person has been in the country and on one's level of assimilation. For example, upon assimilating into a new culture, an immigrant may shed the understanding of a particular aspect of health (e.g., obesity) that they had in their native culture, and take on a new definition for the health condition according to how it is understood in the new country (Angel, Markides, Torres-Gil, & Whitfield, 2009).

Research on self-rated health scores among various racial/ethnic groups do indeed reveal some racial/ethnic differences in referents for the item. Specifically, Krause and Jay (1994) found that 35% of the White respondents in their sample reported thinking about general physical functioning when responding to a self-rated health item, whereas this was true for only 16% of the Blacks and 21% of the Hispanics in their sample. Instead, 46% of the Hispanics and 37% of the Blacks in their sample reported using health problems as a referent in responding to a self-rated health item. Krause and Jay likened the tendency of Black and Hispanic participants to think of health in terms of health problems rather than general physical functioning to the use of health problems as a referent among older adults. Just as older adults have more health problems than

adolescents and young adults, Black and Hispanics in the U.S. generally experience more health problems, on the whole, than Whites in the U.S., making health problems a more salient referent in answering the global health status item.

The Link Between SES and Health

In the past, the link of lower SES with poorer health was largely ignored, with researchers assuming that although poor children are at risk for health and nutrition problems, health conditions in the U.S. are mild compared to those seen in poor, developing countries (Huston et al., 1994). However, in recent decades, increasing attention in social sciences research has been given to the link between lower SES and poorer health, including the problem of health inequalities and the problem of mental health in particular (Oakes & Rossi, 2003). Research shows that the association of lower SES with poorer health holds across the life course and for a variety of health outcomes, with substantial evidence linking lower SES with poorer outcomes related to mental health in particular (Price et al., 2002; Adler et al., 1994; Marmot et al., 1991).

SES effects on health in childhood and adolescence. Even before birth, children from low-SES families are more likely to experience growth retardation and inadequate neurobehavioral development (DiPietro, Costigan, Hilton, & Pressman, 1999; Kramer, 1987). Children from low-SES families are more likely to be born prematurely, at low birth rate, with a birth defect, or with AIDS (Crooks, 1995; Hawley & Disney, 1992; U.S. Dep. Health & Human Services, 2000b; Cassady et al., 1997; Vrijheid, Dolk, Stone, Alberman, & Scott, 2000; Wasserman, Shaw, Selvin, Gould, & Syme, 1998).

After birth, low-SES infants are more likely to experience injuries or to die (Overpeck, Brenner, Trumble, Trifiletti, & Berendes, 1998; Scholer, Hickson, & Ray, 1999). Children from low-SES families have higher rates of respiratory illnesses (Cohen, 1999; Haan, Kaplan, & Syme, 1989; Johnston-Brooks, Lewis, Evans, & Whalen, 1998; Klerman, 1991; Rosenbaum, 1992), higher lead levels in the blood (Brody et al., 1994; Starfield, 1982; Tesman & Hills, 1994), and greater likelihood to experience iron deficiency (U.S. Dep. Health & Human Services, 2000b; Starfield, 1989), stunting (Brooks-Gunn & Duncan, 1997; Korenman & Miller, 1997; Kotch & Shackelford, 1989), and sensory impairment (U.S. Dep. Health & Human Services, 2000b; Starfield, 1989; Wilson, 1993). At every age during childhood, children from low-income families are two to three times as likely to experience complications from appendicitis and bacterial meningitis, and to die from injury or infection (U.S. Dep. Health & Human Services, 2000b).

Among adolescents, low SES is associated with higher rates of depression and obesity, and lower self-rated overall health (Goodman, 1999; U.S. Dep. Health & Human Services, 2000a, b; Call & Nonnemaker, 1999; Brooks-Gunn & Duncan, 1997). Note that low SES is not implicated in all illnesses (Bradley & Corwyn, 2002); for example, it is not related to rates of having asthma in adolescence, and is inconsistently related to suicide attempts and STDs (Goodman, 1999).

SES effects on health in adulthood. The poor health conditions in childhood and adolescence have effects that last into adulthood. One reason this is true is because the severity of certain health-related events, such as being born prematurely, are greater for

children from low-SES families compared to those from affluent families (Parker, Greer, & Zuckerman, 1988). Also, biological impacts during childhood create vulnerabilities that last into adulthood—a phenomenon called "biological embedding" (Hertzman, 1999). Biological embedding refers to early biological damage that has "latent" effects that manifest later in life through their effect on the central nervous system. As evidence for this hypothesis, research has shown that certain conditions that are more commonly experienced in a low-SES environment are associated with specific poor health outcomes in adulthood. For example, low birth weight children have higher propensity for adult cardiovascular disease (Bradley & Corwyn, 2002). SES in adulthood also has been directly associated with a variety of poorer physical and mental health outcomes, including arthritis, disability, diabetes, chronic respiratory diseases, cervical cancer, schizophrenia, substance abuse, and anxiety (House et al., 1992, 1994; Williams & Collins, 1995; Adler & Snibbe, 2003).

Effects of SES components on health. The link between higher SES and better health is generally seen for each of the traditional components of SES: occupation, education, and income. In terms of education, those with higher educational credentials have markedly lower prevalence of a variety of specific health indicators, including difficulty with basic physical activities (e.g., climbing stairs, shopping or getting around), backaches, trouble sleeping, arthritis and osteoporosis, and life longevity. The effect of education on health is thought to occur for several reasons. For one, higher levels of education are associated with increased probability and consistency of employment during the earning years, as well as increased current and past wage or salary. These

higher levels of income, in turn, help humans to meet basic needs (adequate food, shelter, clothes, and care; Williams, 1990), as well as obtain better medical care, medicine, and health insurance. Economic hardship due to limited income, on the other hand, limits housing options and increases the likelihood to live in neighborhoods that present physical risk (i.e., have poor sanitation, dilapidated buildings, environmental toxins, poor heating, etc.; Marmot, 1999; Bradley, Corwyn, McAdoo, & García Coll, 2001; Guo & Harris, 2000; Mayer, 1997), social risk (drugs, prostitution, violence), and a resulting physiological, fight-or-flight response (Mirowsky & Ross, 2003), all of which influence health and self-rated health. Note that average subjective health scores increase the most, and number of serious diagnoses decreases the most, as people rise from the lowest levels of income. That is, large improvements in health are seen with increases in the income of the poorest individuals in the income distribution of the U.S., while the increase in health due to improved income is not as great at upper ends of the income distribution.

In addition to increasing income from earnings, education also influences health indirectly by fostering skills and habits of thought and action that enable individuals to manage their income and their health more effectively (Mirowsky & Ross, 2003). At every level of income, those with higher levels of education are better at securing household needs such as food, clothing, housing, and medical care; and at making sure that bills are paid (Mirowsky & Hu, 1996; Mirowsky & Ross, 1999; Ross & Huber, 1985). Education also increases feelings of perceived control, which impacts behavior, including health behaviors (exercising, quitting smoking, maintaining a healthy weight; Mirowsky & Ross, 2003).

The relationship between occupation and health is perhaps more complex because literature has suggested a stronger bidirectional relationship between these two variables. Full-time employment is related to health because of causation (with employment status affecting health) and selection (with those who are healthier being more able to work; Mirowsky & Ross, 2003). As evidence for causation, researchers have shown that young adults who are employed have greater improvements in subjective health and physical functioning than those who are not employed, even controlling for initial health. Young adults who are employed part-time also experience improvements in health that are between those for full-time employees and unemployed persons (Ross & Mirowsky, 1995).

As evidence for selection, research has shown that being healthy helps individuals to become and remain employed full-time, though this effect was not as strong in the 1990s as it was in the late 1970s and early 1980s. For example, selection effects due to physical impairments are not as strong as they once were because of advances in technology. Complicated patterns for selection effects have also been seen for gender groups over the decades in response to the declining differentiation of men's and women's roles in the workplace and in the home (Mirowsky & Ross, 2003). Higher levels of occupational status have also historically been linked with better health because jobs requiring less education are typically more physically straining (such as construction and working in factories) or dangerous (such as working as a cab driver, which has higher occupational fatality rates due to homicide and vehicular accidents). Again, modification of many jobs due to computer technology, as well as the success of occupational health

and safety regulations and practices, have minimized the effect of occupational risk on health.

Given this large amount of evidence for an association between lower SES and poorer health, the current position in the literature is that the general relationship between SES and health is well established, but the mechanisms underlying this relationship remain relatively unexplored (Price et al., 2002). Key mechanisms between SES and health have been named, however—some of which cannot be changed by a young adult (such as suffering the results of substance use during pregnancy; U.S. Dep. Health & Human Services, 2000a), or are difficult to change (such as having poor housing options; Marmot, 1999; Bradley et al., 2001; Guo & Harris, 2000; Mayer, 1997). However, one way that young adults have some influence over their health is through the practice of healthy lifestyle behaviors.

Health-Relevant Behaviors/Lifestyle

The main mechanism by which SES affects health that is also relatively amenable to effort by the young adult, by which they can exercise agency, is health-relevant (or lifestyle) behaviors (Adler & Ostrove, 1999; Klerman, 1991; Williams & Collins, 1995). Health-relevant lifestyle behaviors are a product of several influences, including modeling, attitudes, stress, and social affiliation (Bradley & Corwyn, 2002). For example, low SES individuals are more likely to use tobacco and alcohol (Baum, Garofalo, & Yali, 1999; Dohrenwend, 1990; Harrell, Bangdiwala, Deng, Webb, & Bradley, 1998). These health behaviors can be transmitted intergenerationally through modeling by low-SES parents, who may engage in the behavior themselves. Poorer academic and behavioral

competence related to substance can result in affiliation with friends who also use substances, which reinforces the behavior (Wills, McNamara, & Vaccaro, 1995). Engagement in health behaviors can reflect attitudes toward the health behavior among different social classes (Rankm, 2000), but may also reflect biologically-driven reactions to stressors in particular socioeconomic environments (Paltiel, 1988).

As children move toward adolescence and young adulthood, they become more responsible for their own health-relevant behaviors. While the impact of the SES experience in childhood remains, the life course perspective emphasizes that young adults are not passive recipients of a life trajectory, but can exercise a considerable amount of agency with regard to their own SES and health. Young adults make decisions that differ in their immediate and long-term economic and health payoff (Mirowsky & Ross, 2003; Elder, 1985, 1994), and set up trajectories for future conditions and options. The young adult who has a sense of perceived control can attempt to manage her health-related behaviors—for example, by exercising daily, eating right, avoiding harmful substances, and preventing harm to herself by avoiding walking alone late at night. Perceived control is one variable explored in this dissertation as a mediator between aspects of SES and health.

Over time, these lifestyle behaviors promote health and prevent/delay the onset of disease, disability, and harm to the self (Mirowsky & Ross, 2003). Many health-related behaviors, across time, manifest themselves in health "stocks," or biological accumulations of health due to lifestyle. Health stocks are summary measures of aspects of health that have accumulated over days, months, and years, such as body fat, aerobic

capacity, blood pressure, artery buildup, bone density, and allostatic load (Mirowsky & Ross, 2003). For example, percent of glycosylated hemoglobin (HbA1c) in the blood is a health stock that indicates whether a person who has diabetes (which cannot necessarily be chosen) has been engaging in the healthy behaviors that are needed to manage this condition, including maintaining a proper diet and exercising regularly (which can be chosen, for the most part). The percentage of hemoglobin in the blood that has been glycosylated is invariant to day-to-day blood sugar levels, but instead depends on whether diabetes management has been consistently poor over a period of months (Woerle et al., 2004), so that this health index reflects not singular behaviors but a lifestyle of behaviors. While visits to doctors, regular exercise, and effort put into purchasing and preparing healthy foods all require time, money, and a sense of personal control or efficacy—all of which may be more sparse for the low-SES individual—the individual is thought, according to a life course perspective, to maintain some degree of agency in these choices.

In this dissertation, I explore the psychological mediators, including perceived control, of the effect of aspects of SES on self-rated health, thus contributing to the needed discussion about the mechanisms by which SES is linked with health. According to Keith (2006), an unlimited number of mediators can be added between two variables to explain how an effect occurs, with each mediator becoming more and more specific in explaining the process at hand. For example, we generally assume that smoking "causes" cancer, but there are an unlimited number of behaviors and links that intervene between these variables, such as contamination of the breath that enters the lungs, which in turn

results in a buildup of tar on the lungs. Support for mediating paths found in this dissertation (such as a path from SES to perceived control to health) will serve as the basis for future work that can investigate how psychological variables affect behaviors, which in turn affect health.

Chapter 4: Psychological Mediators in the Relationship Between SES and Health

Despite consistent and robust links between low SES and poorer health outcomes, many theorists and researchers have stated that we know very little about *how* these effects occur (Kaplan & Lynch, 1997; Adler et al., 1994; Marmot et al., 1991). In the words of Marcia Angell, editor of *The New England Journal of Medicine*, SES is a "most mysterious" determinant of health because its effects are often indirect, taking place not just through poverty or lack of access of health care, but through psychosocial mediators (Angell, 1993, p. 126; see also Adler et al., 1994; Adler & Snibbe, 2003).

Note that psychological variables are usually presented as *mediators* between SES and health, rather than *moderators* (Matthews, Gallo, & Taylor, 2010). According to Keith (2006), mediators are variables that intervene between presumed causes and presumed effects, which help explain *how* an effect takes place. Mediating variables, while elucidating, are not necessary to include in models, but can make causal claims more believable by demonstrating the mechanisms by which effects occur (Pearl, 2000; Keith, 2006). Moderation, on the other hand, refers to an interaction between a presumed cause and a presumed effect due to levels of a third variable, the moderator (Keith, 2006). In other words, if moderation exists, the impact of the causal variable on the dependent variable depends on the value of the moderating variable.

According to a meta-analysis conducted by Matthews et al. (2010), few studies have considered and tested the moderator role of psychosocial variables in the effect of SES on various aspects of health (see Taylor & Seeman, 1999). One exception is in the resiliency literature, in which researchers have identified several personality features,

family characteristics, and external support systems that moderate the effect of SES-related adversity on child well-being (Garmezy, 1993, Masten & Coatsworth, 1998; Rutter, 1990). More often, psychosocial factors have been shown to operate in the role of *direct mediation* between SES and health-related outcomes (Matthews et al., 2010).

There are a variety of mediators that have been named as potential mechanisms by which SES affects health. The MacArthur Network on SES and Health has placed theses mediators into two broad categories: environmental resources/constraints and psychological influences (Adler & Ostrove, 1999). Environmental resources/constraints that have been named as mediators include exposure to teratogens and other hazardous environmental conditions, child abuse, community violence, peer aggression, employment in jobs that present high risk for injury, lack of health insurance, lack of access to high quality health care, and physical inactivity (Bradley & Corwyn, 2002; Garbarino, 1999; Matthews et al., 2010). Psychological influences that have been named as mediators include social support, social participation/integration, depression, positive and negative mood, optimism, self-esteem, stress, fatigue, hostility, anger, anxiety, neuroticism, perceived control, purpose in life, extraversion, reserve capacity, job satisfaction, life satisfaction, financial strain, feeling loved and cared for, and capacity for coping (Matthews et al., 2010).

This dissertation focuses on psychological rather than environmental mediators of the effects of SES on health. This was chosen in order to emphasize that humans are not merely products of their environments, but that health outcomes can be influenced by how we perceive, experience, and act on the world around us (Mirowsky & Ross, 2003;

Elder, 1985; 1994). Among the variety of possible psychological mediators that could be investigated, I focus on three in particular: financial strain, perceived SES, and perceived control.

I chose to investigate financial strain and perceived SES as potential mediators because these are directly related to socioeconomic status—financial strain being defined as the emotional consequence of lacking money (Gutman & Eccles, 1999), and perceived SES being defined as a perception about one's socioeconomic standing relative to others (APA 2007). Because these mediators are related directly to SES, they are strong candidates for explaining the causal links between SES and health. Other potential psychological mediators, such as extraversion, depression, and social participation are not as directly related to SES. For example, studies have shown that high-SES neighborhoods can be just as socially isolating as low-SES neighborhoods, and that women living in these extremely wealthy areas are at higher risk for depression (Luther & Becker, 2002).

Additionally, the third potential mediator that I chose to investigate, perceived control, possesses a very large literature discussing its relationship with SES (e.g., Lefcourt, 1982; Rotter, 1966; Graham, 1994) and is very frequently named as a variable related to SES (Mirowsky & Ross, 2003). For example, job control is one form of perceived control that is directly related to one's occupation (APA, 2007; Karasek & Theorell, 1990; Marmot, Bosma, Hemingway, Brunner, & Stansfeld, 1997; Adler & Snibbe, 2003).

The role of psychological mediators in explaining the connections between SES and health has been explicitly named as a gap in the literature (Matthews et al., 2010;

Bradley & Corwyn, 2002; Price et al., 2002), with recommendations that additional and carefully-designed studies test these mediating mechanisms (Matthews et al., 2010). Exploring these mediating pathways is important because it can help reveal points for intervention (Taylor, Repetti, & Seeman, 1997). In this dissertation, I address this gap by assessing how these mediating variables are related to individual markers of SES (occupational rank, educational attainment, and financial resources), testing whether mediating pathways hold for various genders and races/ethnicities, and assessing whether these pathways are relevant for a particular point in the life course: young adulthood.

Financial Strain

One psychological mediator explored in this dissertation was financial strain. Researchers studying the SES-health relationship have distinguished the effects of financial resources from the effects of *financial strain*, which refers to the emotional consequences of lacking money (Gutman & Eccles, 1999). Models incorporating financial strain posit that lack of money affects individuals not just directly through limiting resources, but also indirectly through emotions of distress (McLoyd, 1990, 1998). That is, financial strain is viewed as a secondary form of stress resulting from insufficient income. For example, when a person loses a job, they not only have less income, but feel emotionally stressed, and experience a loss of structured time, valued relationships, status, identity, and meaningful life goals and purpose (Johoda, 1979). According to APA (2007), traditional measures of income, such as poverty status, do not always capture the experience of the low-income individual, which measures of financial strain aim to address.

In terms of measuring financial strain, typical indicators are based on either on emotions related to not having enough money, or the lack of certain material goods that reflect comfort or participation in society. For example, items have included feeling that one cannot last until the end of a month with one's current supply of money, feeling upset or worried about lack of money, reporting borrowing money to pay bills, lacking a warm coat, not having a telephone, or not being able to buy someone a birthday present (Price et al., 2002; Gutman & Eccles, 1999; APA, 2007).

Financial Strain has been shown to significantly influence health, mental health, and functioning (Price et al., 2002). For example, financial strain is a critical mediator between unemployment and depression (Dooley & Catalano, 1984; Frese & Mohr, 1987; Kessler, House, & Turner, 1987; Vinokur & Schul, 1997; Whelan, 1992), and has been seen to account for 90% of the variation in mental status caused by unemployment status. There is also substantial evidence that the effects of financial strain reverberate through families, undermining relationships and social support, which in turn influence health, and mental health specifically (Vinokur, Price, & Caplan, 1996). According to Elder and Caspi (1988), the impact of sudden economic shocks may be quite different in their impact on families than the influence of chronic poverty because the event produces sudden and often drastic emotional change. Additionally, Price et al. (2002) showed that financial strain due to loss of occupation can affect other psychological variables that promote health, including personal control.

According to Price et al. (2002), researchers should aim to establish greater specificity in the influence of financial strain on health and mental health—for example,

whether this variable operates in unique ways for various populations, who may experience SES-related stressors and adaptational demands differently. I address this point by estimating the effects of occupational rank, educational attainment, and financial resources on financial strain, and the role of financial strain as a mediator between aspects of SES and health, separately by social group.

Perceived SES

A second psychological mediator explored in this dissertation was subjective SES, also referred to as perceived SES. *Subjective SES* is defined as a psychological feeling and comparison of the self to others in the neighborhood, work, or larger community, or in the media, with regard to SES. It is a perception about one's social standing relative to others (APA 2007)—an assessment of SES that is phenomenological rather than objective. The idea of subjective SES comes from deprivation theory (Masters & Smith, 1987; Runciman, 1966; Walker & Smith, 2002), which stresses that what matters is not simply social position but also the perception of it. The assessment of one's SES may depend on who or what is being used as the comparison. For example, if a teenager compares her family's income to what she sees represented on television, and sees affluence overrepresented on the TV, she can feel poor by comparison (Huston et al., 1994).

Formal measurement of subjective SES on a continuous scale is relatively new, dating back to only 2001 with Elizabeth Goodman's creation of the Social Ladder of Subjective Social Status (SSS; Goodman et al., 2001; APA, 2007). Prior to creation of the ladder, researchers often assessed perceived SES simply by asking respondents whether

they were low-, middle-, or high-SES (e.g., Goodman et al., 2000). In contrast, the ladder measure asks respondents to rate themselves on a scale of 1 to 10 in terms of standing in the country, compared to other people, with higher scores signifying greater Perceived SES.

According to APA (2007), research has found that children as young as the first grade in the U.S. have been able to distinguish between upper, middle, and lower social classes (Tudor, 1971). However, respondents are not always accurate in their perceived SES. For example, Scott and Leonhardt (2005) stated that it is common for people to identify themselves as "middle class" even when objective socioeconomic measures suggest otherwise. This overestimation has been found to be more common among working class participants (Goodman et al., 2000).

Subjective SES is associated with various physical and mental health outcomes, even when controlling for objective SES (Adler et al., 2000; APA, 2007), and is therefore an important aspect of SES to include in models of the SES-health relationship. For example, higher levels of subjective SES have been associated with better outcomes on measures of waist-to-hip ratio, heart rate, and psychological distress, including depression and negative affect (APA 2007; Adler & Snibbe, 2003; Adler et al., 2000; Ostrove, Adler, Kuppermann, & Washington, 2000). Among young adults in the U.S., subjective SES has significant effects on obesity and depression, independent of education and income, and independent of self-esteem and popularity (Goodman et al., 2001). It has also has effects on outcomes that are specific to the elderly, including perception of one's ability to handle disabilities later in life (Matthews et al., 2005).

Use of the subjective SES construct is increasing as a way to analyze the mediating pathways between SES and health (Adler et al., 2000; Adler & Snibbe, 2003). It is being used, for example, to analyze why the relationship between material resources (such as access to health care) and the societal health gradient is not simple or linear (Sapolsky, 2005). Other researchers suggest that perceived SES and objective SES should be considered jointly and interactively (Grundy & Holt, 2001; APA, 2007). In this dissertation, I acknowledged the growing evidence that subjective SES impacts health by exploring in my models the effects of occupational rank, educational attainment, and financial resources on subjective SES, and the mediating role of perceived SES in the link between SES and health.

Perceived Control

The last psychological mediator explored in this dissertation was perceived control. Perceived control has been given many labels in the course of psychological literature, including locus of control (Lefcourt, 1982; Rotter, 1966), helplessness (Peterson, Maier, & Seligman, 1993; Seligman, 1975), efficacy (Bandura, 1997), personal control (Gurin, Gurin, & Morrison, 1978), and mastery (Pearlin & Schooler, 1978; see Skinner, 1996 for a review). Briefly, *perceived control* refers to whether a person feels able to influence or control outcomes (Thompson, 1981), and can be characterized by the relationship between an agent (e.g., a person or collective of persons), a means (e.g., an action that one takes), and a desired end (i.e., an outcome).

Perceived control is frequently named as a psychosocial resource that mediates the effect of SES on health. According to Taylor et al. (2008), *psychosocial resource* is a

term from the coping literature that refers to "personal dispositions that may help people perceive potentially threatening events as less so and/or help them to manage their responses to events perceived to be threatening" (p. 197; see also Taylor & Stanton, 2007). Other frequently-named psychosocial resources include optimism, self-esteem, extraversion, and favorable self-concepts in comparison to peers. Higher SES helps individuals to build these psychosocial resources that help individuals to cope with stressors by, first, helping them to avoid stress exposure to begin with, and second, to produce coping responses that are effective rather than depleting and physiologically adverse. In contrast, lower SES diminishes psychosocial resources by increasing exposure to situations that require psychosocial resources, as well as preventing the development and replenishment of resources in reserve (Matthews et al., 2010). That is, low SES diminishes psychosocial resources by introducing greater stress, in both frequency and intensity, and greater biological stress responses.

Higher SES is associated with higher levels of perceived control in particular (APA, 2007; Mirowsky & Ross, 2003). For example, higher-SES occupations give more opportunity for control, such as control over job conditions (including safety) and greater ability to choose tasks that are novel and challenging, rather than repetitive (APA, 2007; Karasek & Theorell, 1990; Marmot, Bosma, Hemingway, Brunner, & Stansfeld, 1997; Adler & Snibbe, 2003). Low-status occupations, on the other hand, generally provide fewer opportunities for control over job conditions, and have been thought to introduce greater occupational stress, also referred to as job strain. *Job strain* is defined as a combination of high demands and low levels of control in the work environment

(Matthews et al., 2010). Job strain can be considered a type of chronic stress, and is tightly knit with SES. For example, one study showed that job strain explained much of the association between occupational grade and coronary heart disease, but that perceptions of control accounted for most of this effect (Wamala, Mittleman, Horsten, Schenck-Gustafsson, & Orth-Gomér, 2000).

Research shows that members of different gender and racial/ethnic groups garner a sense of perceived control from different aspects of SES. For example, Bruce and Thornton (2004) showed that White men and women garner a sense of perceived control from higher levels of income, while Black men and women garner a sense of perceived control from having attained higher levels of education. This dissertation takes theses nuances into account by modeling the effects of occupation, education, and income on perceived control, and the effect of perceived control on self-rated health, separately by gender and race/ethnicity.

The effect of perceived control on health is important to include in models of SES and health because, according to many researchers, higher levels of perceived control reduce the gradient between SES and heath (Adler & Snibbe, 2003; Bosma, Schrijvers, Mackenbach, 1999; Bosma, Van Jaarsveld, & Tuinstra, 2005; Schnittker et al., 2004; Lachman and Weaver, 1998). For example, Lachman and Weaver (1998) found that health outcomes were similar between low- and high-SES men and women across adulthood when low-SES men and women had high levels of perceived control. Another study showed that variation in locus of control reduced the association of SES with mortality among adult men and women living in the Netherlands by 37-57% (Bosma et

al., 1999). General control beliefs also were shown to significantly reduce the association of SES with coronary heart disease among older adult men and women by nearly 30% (Bosma et al., 2005). General control beliefs have additionally been shown to reduce the association of income with total number of chronic health conditions by 12%, and the association of education with total number of chronic health conditions by 4% (Schnittker, 2004). These effects are thought to occur because higher levels of perceived control influence behavior, encouraging individuals to be agentic with regard to conditions. For example, with higher levels of perceived control, one can decide to engage in positive health and problem-solving behaviors such as exercising daily, eating right, or preventing harm to oneself by taking the bus instead of walking late at night. These behaviors, over time, promote health or prevent/delay the onset of disease, disability, and harm to the self (Mirowsky & Ross, 2003).

A potentially important distinction to make with regard to perceived control is whether it is measured in state or trait form. State versus trait is a common distinction made in the conceptualization and measurement of psychological constructs. The two forms are different dimensions of the construct being measured, *state* defined as a transitory feeling that can fluctuate over time and can vary in intensity; and *trait* defined as a relatively stable individual difference in proneness or tendency for the behavior (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; Vineau & Cormier, 2008). State-like conceptualizations of perceived control are seen in experimental research in which conditions are manipulated for participants, and the change in participants' levels of perceived control is measured, as in Biner's work on the effect of hunger and choice on

feelings of control in games of chance (e.g., Biner, Angle, Park, Mellinger, & Barber, 1995; Biner, Huffman, Curran, & Long, 1998). Trait-like conceptualizations of perceived control, on the other hand, are seen in research measuring participants' loci of control, for example, whether participants generally view their life outcomes to be due to internal or external forces (Rotter, 1954, 1966).

In sum, including these psychological variables that are closely tied with SES—financial strain, perceived SES, and perceived control—in models of the SES-health relationship, and testing the significance of these mediating paths in each social group, I contribute valuable information to the state of research on the SES-health relationship. Specifically, by investigating the role of these psychological mediators, I shed light on the "mystery" of *how* SES affects health (Angell, 1993; Matthews et al., 2010) and whether these mediating mechanisms work similarly or differently for various social groups in the U.S.

Chapter 5: Confounding Variables in the Relationship Between SES and Health

With an abundance of evidence that lower SES is linked with poorer health outcomes, researchers have become concerned with variables that may confound this relationship because of their role as a common cause or a moderator (APA, 2007). According to Keith (2006), omitting a key variable, particularly a variable that is a common cause of both the presumed cause and the presumed effect, is the biggest threat to the valid interpretation of estimates from an SEM analysis, and in nonexperimental research in general. Not *all* causes of the main variables of interest must be included in an SEM model—only those that are significant common causes of the exogenous and endogenous variables. If a common cause of SES and health is omitted from models, then the true effects of SES on health could in fact be much smaller than has been suggested by the research literature. Likewise, omitting a moderator variable can lead to inconsistent findings across studies of the relationship between SES and health (Bradley & Corwyn, 2002). When moderating variables are included in models, researchers may find that the impact of SES on health "depends" on levels of the moderator. To explore whether my findings might be confounded by the exclusion of important related variables, I estimated models in which I separately added two variables that are closely related to young adulthood SES and young adulthood health: intelligence and the SES of one's family of origin.

Intelligence, SES, and Health

Intelligence is a broad term referring to a construct that predicts future success (Gottfredson, 2003). When intelligence is measured by conventional psychometric tests,

it is often referred to as "IQ" (Gottfredson & Deary, 2004). IQ tests attempt to measure analytic, internal knowledge—particularly the ability to solve problems, learn from context and reason, think critically, analyze and evaluate ideas, and make decisions (Gottfredson, 2003). While conventional views posit that intelligence is a relatively stable attribute, alternative views conceptualize intelligence as "developing expertise"—an "ongoing process of the acquisition and consolidation of a set of skills needed for a high level of mastery in one or more domains of life performance" (Sternberg et al., 2000, p. 2, 9). Other types of intelligence thought to be important for success include creative intelligence, practical intelligence, and tacit knowledge (Gottfredson, 2003).

In this dissertation, I consider the role of IQ as a potential common cause of SES and health, since most literature on the role of intelligence in predicting SES and health have referred specifically to this construct, rather than other forms of intelligence (e.g., Huston et al., 1997; Huston et al., 1994; Hart & Risley, 1995; McCall, 1977; Gottfredson & Deary, 2004; Duncan, Brooks-Gunn, & Klebanov, 1994). If IQ is a common cause of SES and health, including IQ in models of SES and health among young adults may reveal more accurate estimates of how various aspects of SES directly relate to health.

Countless studies have demonstrated that IQ is related to various aspects of SES, including occupational prestige, educational attainment, and income (Huston et al., 1997)—though the causal direction of this association remains unclear (APA, 2007; Gottfredson, 2003). On one hand, SES may "cause" IQ. As evidence, consider that family poverty at age three predicts IQ at age five, even with age three IQ controlled (Duncan, Brooks-Gunn, & Klebanov, 1994). Also consider that lower SES is associated with poor

nutrition, exposure to lead paint and other environmental toxins associated with poor neighborhoods, and higher rates of child abuse—conditions that, in turn, are thought to have negative effects on intelligence and functioning (APA, 2007; Garbarino, 1999; Hart & Risley, 1995). Additionally, low-SES children have been shown to experience less cognitive stimulation at home than higher-SES children (Hart & Risley, 1995; Hoff, Laursen, & Tardiff, 2002; Hoff, 2003; Raviv, Kessenich, & Morrison, 2004). This results in lower-SES children possessing poorer verbal abilities, which are commonly measured as one part of intelligence, including in the Peabody Picture Vocabulary Test (PPVT; Dunn, 1981).

There has been debate about which aspects of parents' SES connect most strongly with children's cognitive development. While some evidence suggests that family income accounts for the most variance (e.g., White, 1982), several studies have shown that occupation, education, and income are each significant predictors of intellectual attainment (Mercy & Steelman, 1982) and school achievement (DeGarmo, Forgatch, & Martinez, 1999). Even neighborhood economic conditions, though less powerful than family income effects, have been shown to be significant predictors of intelligence, whereby children with more affluent neighbors have higher IQs (Huston et al., 1994).

Other studies imply that directionality between SES and IQ occurs in the reverse order, with IQ "causing" SES, particularly educational attainment. For example, five-year-old children in chronic poverty have been shown to have adjusted mean IQs about two-thirds of a standard deviation lower than nonpoor children, which then influences cognitive performance and behavior. Poorer cognitive performance in school can, in turn,

influence graduation from high school or college—the clearest predictors of adult income and occupational status (Huston et al., 1997). One classic study by McCall (1977) demonstrated this link explicitly by showing that childhood IQ predicts adult occupational status (cited in Huston et al., 1997).

Higher levels of intelligence are also associated with better health, highlighting its role as a potential common cause of both SES and health. For example, lower IQ at age 11 has been significantly associated with greater likelihood of dying from cardiovascular disease in general, coronary heart disease, and lung cancer (Hart et al., 2003). While a small part of this effect of IQ on mortality was indirect, through IQ's influence on adult social class and deprivation, most of this effect was direct. Similarly, one longitudinal study based in Scotland demonstrated that childhood intelligence predicts cancer, cardiovascular disease, and mortality in adulthood, even after controlling for SES variables (Gottfredson & Deary, 2004).

Gottfredson and Deary (2004) name several reasons for the direct association between IQ and health. For one, IQ is an "archaeological record" of prenatal and childhood health insults (p. 3). Higher intelligence is also associated with health behaviors—the behaviors that lead to better health—including physical fitness and a preference for low-fat and low-sugar diets, while lower intelligence is associated with alcoholism, persistent smoking, and obesity (Gottfredson & Deary, 2004; Gottfredson, 2004). Higher-intelligence people also select into healthy environments, such as nonhazardous occupational environments. Additionally, those with higher levels of IQ

attain higher levels of education, and thus achieve better jobs that provide better health care plans for their employees.

Another major factor in the association of higher IQ with better health is health literacy. Persons with better intelligence tend to have better health literacy, enabling them to understand and adhere to both routine and more complex health treatment plans. Gottfredson and Deary (2004) emphasize that noncompliance of patients to adhere to physican-recommended treatment plans reflects inability, not unwillingness. Poor healthy literacy is not uncommon; for example, Williams et al. (1995) found that among outpatients at two urban U.S. hospitals, 26% of outpatients were unable to determine from an appointment slip when their next appointment was scheduled, and 42% did not understand the instruction to take medicine on an empty stomach. Proportions of people who are unable to understand more complex health treatment plans can be even higher. For example, in another study, Williams and colleagues found that among low-literacy persons with insulin-dependent diabetes, 50% did not know the signs of very high or low blood sugar, and 60% did not know what corrective actions to take when blood sugar is too low or high (Williams, Baker, Parker, & Nurss, 1998). Greater access to health information does not necessarily translate into greater equality in adherence to the best health treatment plans. In fact, greater access to health information by the public tends to *increase* health-related knowledge gaps, as already-informed persons learn and act on the new information, whereas the relatively uninformed do not (Gottfredson, 2004).

Because IQ is a known cause of both SES and health later in life, inclusion of IQ in models of the SES-health relationship among young adults may alter estimates of

aspects of SES on health. To account for this possibility, I add IQ as a predictor of aspects of SES and of health in my models. Determining whether relationships between aspects of SES and health persist even when accounting for this common cause helps to address the threat of invalid conclusions about the cause-and-effect relationships in the models (Keith, 2006).

Childhood SES, Young Adulthood SES, and Health

Childhood SES is a second potential confounding variable in models of the SES and health of young adults because it can be viewed as a common cause or as a moderator of the relationship between SES and health. Thus, when childhood SES is included in models of the SES-health relationship in young adulthood, researchers may find the relationship between SES and health is attenuated, or that it depends on levels of one's SES of origin.

Childhood SES is correlated with or "causes" young adulthood SES because SES is transmitted across generations (Blau & Duncan, 1967; Matthews et al., 2010). Transmission of SES across generations is thought to occur for several reasons. One reason is that certain aspects of higher-SES families give their children a better schooling experience, while aspects of lower-SES families result in children from these families falling behind. Specifically, higher-SES families tend to possess more educational resources in the home, more valuable social networks, and greater knowledge about how to access higher education (APA, 2007), all of which help their children to achieve in school and obtain better jobs. In contrast, low-SES families have been shown to exhibit a lower sense of connectedness to schools and involvement in schools, and to have

relatively fewer educational resources in the home. Their children also tend to attend schools with less qualified teachers (Evans, 2004). Additionally, teenage pregnancy is more common among females from lower-SES families than from higher-SES families, which reduces likelihood to complete high school and to attend college (Matthews et al., 2010).

A second reason why lower-SES families produce children who grow to be low-SES adults is because the harsh early family environment associated with low SES leads to poorer psychosocial functioning. According to Matthews et al. (2010), the combination of experiencing high levels of negative emotions and low levels of positive emotions in these environments is associated with a lack of coping skills, which hinders the ability to complete a degree and successfully hold a job. For example, one study by Duncan et al. (1994) showed that children in families experiencing both persistent and occasional poverty had more internalizing behavioral problems than children whose families were never poor, with greater problems seen among children who experienced persistent poverty (cited in Huston et al., 1994). Likewise, the NICHD Early Child Care Network Study showed that the longer a child lived in poverty between birth and age 9, the more likely the child was to exhibit behavioral problems (Rowe, Vesterdal, & Rodgers, 1999).

Note that transmission of SES from parents to children is not perfect, however. For example, studies of SES among children from the same families show that measures of siblings' adulthood SES are not perfectly correlated (Taubman, 1976; Bjorklund, Jantti, & Solon, 2005). One sibling from a low-SES family may be more successful in adulthood due to individual differences in personality, as well as personal agency—the

exercise of control over life events rather than passively "receiving" one's trajectory or path (Elder, 1985; 1994).

Childhood SES is also correlated with health later in life, highlighting its role as a potential common cause in the SES-health relationship. Several studies suggest that childhood SES and the length of time spent living in low-SES conditions during childhood are meaningful predictors of health outcomes in adulthood (Adler & Snibbe, 2003; Repetti et al., 2002), including cardiovascular disease, mortality from hemorrhagic stroke, and certain forms of cancer (Galobardes, Lynch, & Smith, 2004; Chen, Matthews, & Boyce, 2002). Power (1991) demonstrated the same phenomenon, showing that SES in middle childhood and adolescence predicted health at age 23, even when controlling for SES at age 23.

This connection between childhood SES and adult health is thought to exist because health conditions established early in life have long-lasting effects (Matthews et al., 2010; McLoyd, 1998; Bradley et al., 1994). Children from low-SES families are more likely to experience growth retardation and inadequate neurobehavioral development even while in utero (DiPietro et al., 1999, Kramer, 1987); and are more likely to be born with a birth defect, a disability, fetal alcohol syndrome, or AIDS (Crooks, 1995; Hawley & Disney, 1992; U.S. Dept. Health & Human Services, 2000b, Cassady et al., 1997; Vrijheid et al., 2000; Wasserman et al., 1998). All of these health conditions affect health continually through adulthood. Moreover, biological impacts experienced during childhood create vulnerabilities for the rest of the life course, a process referred to as "biological embedding" of early experience (Hertzman, 1999), often described as a

sculpting of the central nervous system that affects cognition, behavior, and social development across life.

This connection between childhood SES and adult health is thought to be due not only to biology and childhood disease, but also due to differences in psychosocial development. Low-SES families are more likely to be associated with "risky family characteristics," including familial conflict; neglect, non-nurturant behavior (Evans, 2004; Repetti, Taylor, & Saxbe, 2007; McLoyd, 1998); harsh or inconsistent parenting styles (Evans, 2004; Reid, Macchetto, & Foster, 1999; Troxel & Matthews, 2004); heightened risk for physical mistreatment or abuse (Reid et al., 1999; Emery & Laumann-Billings, 1998); and exposure to family violence (Bradley et al., 2001). Risky families fail to provide children with the experiences needed for the development of effective socioemotional skills, often resulting in a generalized mistrust of others, poor social and coping skills, feelings of depression, anxiety, anger, and hostility (Repetti et al., 2007; Matthews et al., 2010). The emotional dysregulation resulting from the characteristics of risky families is also associated with elevated cortisol responses to threatening circumstances (Feldman, Fisher, & Seitel, 1997). These physiological and emotional symptoms have been associated with poorer health behaviors and adverse health outcomes in adulthood (Repetti et al., 2007; Taylor, Lerner, Sage, Lehman, & Seeman, 2004; McLoyd, 1998; Matthews et al., 2010).

In addition to being a common cause, childhood SES can also confound the relationship between young adulthood SES and health because it is a *moderator* of this relationship. As mentioned, omitting childhood SES as a moderating variable can lead to

inconsistent findings across studies of the relationship between SES and health in young adulthood because the strength of this relationship "depends" on one's childhood SES (Bradley & Corwyn, 2002). Strong evidence suggests that early deprivations in learning, cognition, and living standards have negative effects on cognitive and emotional development (APA, 2007). While children from impoverished environments can make gains later in life, research shows that the gap in achievement between these children and more privileged children tends to continually increase (Ceci & Papierno, 2005; Evans, 2004; Merton, 1998). Similarly, the poor health conditions experienced by low-SES children tend to be more severe (e.g., birth defects, disabilities, AIDS), having pervasive effects across the life span (Crooks, 1995; Hawley & Disney, 1992; U.S. Dept. Health & Human Services, 2000b, Cassady et al., 1997; Vrijheid et al., 2000; Wasserman et al., 1998). These long-lasting health conditions, along with biological embedding of vulnerabilities at an early age (Hertzman, 1999), creates a dynamic in which children from impoverished families may be less able to change or influence their SES and health trajectories later in life through pursuit of education, exercise of personal control over health behaviors, etc.

In this dissertation, I address the role of childhood SES as a potential common cause or moderator of the relationship between SES and health in young adulthood. I do this by including it as a main effect predicting both SES and health in young adulthood, and by including interaction terms between childhood SES and young adulthood SES in the model, then assessing the significance of these interaction terms. In considering childhood SES as a potential confounding variable, I separately consider (a) parental

education and (b) family income to needs ratio. As mentioned in Chapter 2, a family income to needs ratio is a ratio of household income to a poverty threshold set by the U.S. Department of Health and Human Services that is adjusted to inflation and family size (Huston et al., 1994). It is a continuous measure of *depth* of poverty, not a 0/1 dichotomous variable. The testing of parental occupation as a confounding variable was not possible because Add Health does not provide ranks of parents' occupations or much other information on the nature of parents' jobs. Add Health only provides information on whether the parental respondent has been employed or not, which makes analysis of the effects of parental occupation less feasible because the spouse or partner in these families may be employed, even if the respondent is not.

As with IQ, including the direct effects of childhood SES as well as interaction effects between childhood SES and young adulthood SES in this dissertation's models of the SES-health relationship among young adults addresses whether the exclusion of childhood SES confounds the relationships between aspects of SES and health in this population. Including childhood SES in the models helps to address concerns about the validity of my conclusions about the effect of aspects of SES on health, and sheds light on whether the impact of SES on health "depends" on levels of childhood SES.

Chapter 6: Summary of Contributions to the Literature

The goals of this dissertation were: first, to describe aspects of the SES of young adults of different gender and racial/ethnic groups; second, to examine how these aspects of SES relate to each other and to self-reported health; third, to examine the mediating roles of psychosocial variables—financial strain, perceived SES, and perceived control—between SES and health; and fourth, to account for potential confounding variables in the relationships between aspects of SES and health.

This dissertation makes several important contributions to the state of research on the association between lower SES and poorer health. Models included not only traditional aspects of SES (occupational rank, educational attainment, and financial resources), but also psychological aspects of SES (financial strain and perceived SES), and the closely-knit variable of perceived control. This multi-faceted approach to the conceptualization of SES acknowledges contemporary thought that SES entails not only objective aspects (occupational rank, education attainment, and financial resources), but subjective experience (Gutman & Eccles, 1999; Goodman et al., 2000, 2001; APA, 2007). The use of sound SEM techniques to develop appropriate measurement models for these aspects of SES by social group acknowledges the critique that more studies should investigate the operationalization of these SES constructs (Oakes & Rossi, 2003), including how these constructs might differ by subpopulation (e.g., Price et al., 2002).

Further, in estimating the structural models separately by social group, I acknowledged that aspects of SES are not linked with each other and with health in the same ways for all people (Muhammad et al., 2004; Bruce & Thornton, 2004; Price et al.,

2002; APA, 2007). Estimating the structural models separately by social group also shed light on the unique mediating paths between aspects of SES and health for different social groups (Bradley & Corwyn, 2002). This will help address the "mystery" of how SES affects health via psychosocial mediators (Angell, 1993; Adler & Snibbe, 2003; Matthews et al., 2010). Additionally, considering the role of potential confounding variables, IQ and childhood SES, strengthened claims of the significance of these paths.

Young adulthood is a fitting time in the life course for this investigation, and for interventions in the links between SES and health, because it is a time when one's health is one's own responsibility. While certainly not ignoring the impact that childhood SES has on life throughout the life course (e.g., Parker et al., 1988; Hertzman, 1999; Matthews et al., 2010; McLoyd, 1998; Bradley et al., 1994), young adults are not just passive "recipients" of their socioeconomic and health outcomes, but can make decisions that differ in their immediate and long-term socioeconomic and health payoff. Paths found in this dissertation between SES, the psychological mediators, and health present potential points of intervention, in which young adults may alter their health behaviors before middle and older adulthood, when there may be less opportunity for change in socioeconomic and health trajectories (Mirowsky & Ross, 2003; Elder, 1985, 1994).

Chapter 7: Methods

I used a large, nationally representative data set, the National Longitudinal Study of Adolescent Health (Add Health: Harris et al., 2009), to test my research questions. Add Health contains data on tens of thousands of adolescents and young adults in the U.S., which allowed me to construct SEMs in order to answer questions about the measurement of various aspects of SES, the structural relationships between these aspects of SES, and the predictive relationships of these aspects of SES with self-rated health. Further, the large size of this data set allowed me to divide the data into two halves (one half for exploration, and the other for cross-validation), to run analyses separately by gender and racial/ethnic social groupings, and to model a series of complex SEMs, each with a number of parameters to be estimated, described here.

Data

The longitudinal data I used came from the first and fourth waves of Add Health (Harris et al., 2009). Add Health was ideal for this dissertation because it contains a variety of information on participants' SES, on many psychological variables, and on health. It was also ideal for investigating the relationships between SES and health in young adulthood because in the fourth wave of data, participants were 24-32 years old. Add Health is nationally representative, with the selection of participants based on the schools they attended during the 1994-95 school year, which were chosen from a complete list of American high schools (Quality Education Database) based on region, school type, racial composition, urbanicity, and size. At Wave I, participants were in grades 7 through 12. A selection of Wave I participants completed in-home interviews at Wave I, while their

parents (preferably, the resident mother) completed an Parent In-Home Questionnaire. At Wave IV, the staff of Add Health attempted to collect data from all youth who participated in the in-home interview portion of Wave I data collection. This Wave IV data collection occurred in the residences of participants in 2007 and 2008. Ninety-three percent (93%) of the original Wave I sample was found at Wave IV, and 80.3% of this eligible sample was successfully re-interviewed.

For this dissertation, two filters were applied to the Add Health data prior to data analysis. First, I limited the sample to male and female participants who belong to one of the three largest ethnic/racial groups in the U.S.: Hispanics/Latinos, non-Hispanic Blacks, and non-Hispanic Whites (U.S. Census Bureau, 2008). Then, I limited the sample to those participants who have Wave IV longitudinal sampling weights so that I could apply these weights to final models. The final sample included of 8,451 participants. This sample was then randomly divided into two halves: one half an exploratory sample, and other half a cross-validation sample.

Measures

Items used in the analyses, and response options/ranges after recoding, are listed in Table 2. Full wording of items are available in the Appendix. Items reflecting occupational rank, educational attainment, and financial resources were considered to measure traditional, "objective" aspects of SES (APA, 2007). Items reflecting financial strain and perceived SES were considered to measure "subjective" aspects of SES, or the experience of SES above and beyond tangible resources (APA, 2007; Gutman & Eccles, 1999; Price et al., 2002). These subjective aspects of SES are understood as mediators of

the effect of occupational rank, educational attainment, and financial resources on health (Angell, 1993; Adler et al., 1994; Adler & Snibbe, 2003; Matthews et al., 2010). Finally, perceived control was considered to be an alternative psychological mediator of the effect of occupational rank, educational attainment, and financial resources on health (APA, 2007; Adler & Snibbe, 2003; Karasek & Theorell, 1990; Marmot et al., 1997). Self-rated health was the final outcome of interest. Note that in this dissertation, I use the term "financial resources" in lieu of "income" in order to be inclusive to several aspects of finances that may affect health among young adults—including not only personal earnings, but contributions to household income from others (including spouses and parents), assets (such as ownership of a car), and home ownership.

Table 2

Items Used in Measurement, Structural, and Predictive Models

Construct	Add Health Item(s) used in Construction of Variable/Factor	Description	Response options, once items marked "rev" are reversed
Sex	BIO_SEX3	interviewer report of participant being male or female	0 (male) or 1 (female)
Race/Ethnicity	H3OD2	Wave III self-report of being Hispanic/Latino	0 (no), 1 (yes)
	H3OD4A	Wave III self-report of being White	0 (no), 1 (yes)
	H3OD4B	Wave III self-report of being Black	0 (no), 1 (yes)
	H3OD4C	Wave III self-report of being Amer Indian/Native American	0 (no), 1 (yes)
	H3OD4D	Wave III self-report of being Asian/Pac Islander	0 (no), 1 (yes)

Table 2 (cont'd)

Young Adulthood Occupational Rank (most recent job)	H4LM19	Hours work/wk	10-168 hours
	H4LM21A	Job provides hlth insur	0 (no), 1 (yes)
	H4LM21B	Job provides ret benefits	0 (no), 1 (yes)
	H4LM21C	Job provides pd vac/sick	0 (no), 1 (yes)
	H4LM22	Physical level of job	1 (high) to 4 (low)
	H4LM23	Decision-making at job	1 (low) to 4 (high)
	H4LM24 (r)	Repetitiveness of job	1 (high) to 4 (low)
	H4LM25	Supervisory role	1 (low) to 3 (high)
	H4LM26	Job satisfaction	1 (low) to 5 (high)
	H4LM27	Part of career goals	1 (no goals) to 4 (high)
Young Adulthood Educational Attainment	H4ED2	Highest level of educ achieved to date	1 (low) to 13 (high), with numbers marking credentials/partial credentials
Young Adulthood Financial Resources (in interview year)	H4EC1	Household income	1 – 10
	H4EC2	Personal earnings	$0 to $999,995
	H4EC4	Own/process own home	0 (no), 1 (yes)
	H4EC7	Household assets	1 (low) to 9 (high)
Perceived Control	H4PE37 (r)	Can do little to chnge thngs	1 (low) to 5 (high)
	H4PE38 (r)	Othrs determ what can do	1 (low) to 5 (high)
	H4PE39 (r)	Things interf w/want to do	1 (low) to 5 (high)
	H4PE40 (r)	Little control over things	1 (low) to 5 (high)
	H4PE41 (r)	No way to solve problems	1 (low) to 5 (high)
	H4MH3 (r)	Unable to control things (past 30 days)	1 (low) to 5 (high)
	H4MH4	Confid in abil to hand probs (past 30 days)	1 (low) to 5 (high)
	H4MH5	Things going your way (past 30 days)	1 (low) to 5 (high)
	H4MH6 (r)	Cldn't overcome difficulty (past 30 days)	1 (low) to 5 (high)
Perceived SES	H4EC19	MacArthur Social Ladder of Subjective Social Status	1 (low) to 10 (high)
Financial Strain (past 12 months)	H4EC10	Without phone service	0 (no), 1 (yes)
	H4EC11	No rent or mort. payment	0 (no), 1 (yes)
	H4EC12	Evicted b/c no rent/mort pd	0 (no), 1 (yes)
	H4CE13	Didn't pay gas, elec, oil	0 (no), 1 (yes)
	H4EC14	Gas, electric, oil turned off	0 (no), 1 (yes)
	H4EC15	Worried food would run out	0 (no), 1 (yes)

Table 2 (cont'd)

Self-rated Health	H1GH1	In general how is your health?	1 (low) to 5 (high)
Family Income to Needs Ratio (Childhood SES)	PA55	Wave I parental respondent's report of family household income	$0 to $999, with numbers marking thousands of dollars in 1994
	H1HR3A - H1HR3T	Wave I participant's report of household members	0 to 20 persons
Parental Education (Childhood SES)	PA12	Wave I parent's level of education (0 – 9)	0 (low) to 9 (high), with numbers marking credentials/partial credentials
IQ	AH_PVT	Wave I Add Health Picture Vocab Test standardized score	13 to 146
Weighting Variable	GSWGT4	Post stratified untrimmed longitudinal grand sample weight	26.55 to 16323.66

Note. The notation "r" signifies that the item was reverse-scored.

Young Adulthood Occupational Rank. Ten occupation-related items, shown in Table 2, were selected for a factor analysis intended to create a latent Young Adulthood Occupational Rank construct. Items included aspects of occupational rank that have been named by APA (2007), including job benefits, degree of physical labor involved in the job, degree of personal decision-making in the job, variety of tasks involved (compared to monotony), and whether the job is part of the respondent's long-term career. Response options are marked in Table 2.

Young Adulthood Education Attainment. Educational attainment was measured using a single self-report item reflecting the credentials/partial credentials the respondent had received by Wave IV. Response options ranged from 1 (8th grade or less) to 13 (completed post-baccalaureate professional education).

Young Adulthood Financial Resources. Four items marking financial resources, shown in Table 2, that have been named by APA (2007) as indicators of income or wealth were selected for a factor analysis intended to create a latent Young Adulthood Financial Resources construct. Items included self-reported personal earnings, household income, household assets/wealth, and home ownership (including being in the process of owning). Item response options are marked in Table 2. Note again that I conceptualize this construct not as Income but as Financial Resources in acknowledgment that there are several aspects of finances that potentially affect health among young adults—not personal earnings alone.

Financial Strain. Six items marking financial strain, shown in Table 2, were selected from the Economics module of the Wave IV data for a factor analysis intended to create a latent Financial Strain construct. These items were selected based on literature stating that traditional measures of income do not always capture the experiences of the low-income individual, including the lack of items necessary for participation in society, such as a telephone (APA, 2007). All items were dichotomous, with "1" marking presence of the financial strain and "0" marking its absence.

Perceived SES. One item was used to measure perceived SES. This item was the MacArthur Social Ladder of Subjective Social Status (SSS; APA, 2007; Goodman et al., 2001). The ladder measure allows respondents to rate themselves on a scale of 1 to 10 in terms of their perceived social status, compared with others in the U.S., with higher scores signifying higher perceived SES. Work by Elizabeth Goodman shows that the SSS has good test-retest reliability among adolescents aged 15 and higher; and that SSS has significant effects on the health outcomes of obesity and depression among young adults in

the U.S., independent of education and income, and independent of self-esteem and popularity (Goodman et al., 2001).

Perceived Control. Nine items were selected from two modules of Add Health (the Personality module and the Social Psychology/Mental Health module) for a factor analysis intended to create a latent Perceived Control construct. Personality items asked respondents to agree or disagree with items about "you as you generally are now," while Social Psychology/Mental Health items asked about the frequency of feeling a certain way in the past 30 days. All Perceived Control items ranged from 1 to 5. After the recoding shown in Table 2, higher scores reflected greater Perceived Control.

Self-rated Health. Self-rated health, the dependent variable of main interest, was measured with a single item asking the participant "In general, how is your health?" Response options ranged from 1 (poor) to 5 (excellent).

IQ. IQ was measured using Wave I score on the Add Health Picture Vocabulary Test (AHPVT), an assessment of the participant's comprehension of spoken English vocabulary, administered during the in-home interview portion of Wave I Add Health data collection in 1994-1995. The test was an abridged version of the revised Peabody Picture Vocabulary Test (PPVT; Dunn, 1981), for which scores have been found to correlate moderately well with scores on other tests of IQ, such as the Wechsler Intelligence Scale for Children and the Stanford-Binet Intelligence Scale (Dunn, 1981). Raw scores on the test were standardized by Add Health staff using the test's scoring manual. The standardized scores were used in this dissertation. This Wave I measure of IQ was chosen because there is no measure of IQ in the Add Health data at Wave IV.

Additionally, IQ was used as a control variable, and placement of this variable temporally prior to the other SES and health variables strengthens the claim that it is a "cause" of SES and health at Wave IV.

Childhood SES. Childhood SES was assessed with two different measures. The first was the parental respondent's report of level of educational attainment at Wave I, which ranged from 0 (never went to school) to 9 (professional training beyond a 4-year university). This measure reflected parent's credentials or partial completion of credentials, not years of education.

The second measure of childhood SES was Family Income to Needs Ratio, which was constructed by dividing the parental respondent's self-reported household income at Wave I by the 1994 poverty line (in dollars) for a family of a size indicated by the main participant at Wave I. Poverty lines by family size were taken from guidelines published by the U.S. Department of Health & Human Services (U.S. Department of Health & Human Services, 2011). These poverty lines are calculated by taking a base term (reflecting a number of dollars needed in a given year to meet the needs of a one-person family) then adding to this base term the product of a second term and the number of additional persons in the family (reflecting additional dollars to meet the needs of the additional persons in the family).

Sex. Biological sex was based on the interviewer's report of the respondent's biological sex at Wave I, which was coded with a 0 (male) or 1 (female). There was 100% alignment between interviewer-reported biological sex at Wave I and interviewer-reported sex at Wave III. Biological sex was not recorded by Add Health at Wave IV.

Race/ethnicity. Race/ethnicity was based on a series of Wave III variables in which Add Health participants reported whether they were of Latino/Hispanic origin; and whether their race was White, Black/African American, American Indian/Native American, and/or Asian/Pacific Islander. Respondents were able to report that they belonged to as many of these social groupings as they felt described themselves. For purposes of creating in-tact groups for multi-group SEM analyses in this dissertation, subsamples based on race/ethnicity were created by selecting those respondents who reported being non-Hispanic White *only*, non-Hispanic Black *only*, or Hispanic in combination with any other racial group, such as White or Black.

Wave III self-reported race was chosen in lieu of Wave I self-reported race dissertation because self-reports of race changed across waves of Add Health. Specifically, 5% of participants in the sample selected for this dissertation reported a different race at Wave III than they did at Wave I. Thirty-nine percent (39%) of the cases whose self-reported racial/ethnic identity changed between Wave I and Wave III reflected a switch from a "Latino" self-description to a "White" self-description. The next largest category reflected switches from Black to White self-reported race (30%). These switches in self-reported racial/ethnic identity suggest that some participants' understanding of their ethnic identity changed across development (from grades 7-12 at Wave I, to young adulthood at Wave IV). There is no self-reported race data for Wave IV, the wave from which most variables for this dissertation were selected. Thus, Wave III race data is utilized here, as this is the wave that is closest in time to Wave IV and is the most likely to capture participants' racial/ethnic identity in young adulthood.

Analyses

Analyses proceeded in three steps: first, measurement models (presented in Chapter 9); second, structural models (presented in Chapter 10); and third, predictive models (presented in Chapter 11). Each of these three steps involved analyses performed first on the exploratory sample, and then in the cross-validation sample. Within analyses performed in the cross-validation sample, models were run first across all participants, then separately by gender (two groups), race/ethnicity (three groups), and both gender *and* race/ethnicity groupings (six groups total), where appropriate.

Data were prepared in SAS Version 9.1 and analyzed in Mplus Version 5.2. The estimation method used for was Weighted Least Squares with adjusted Means and Variances (WLSMV), which provides better estimates than Maximum Likelihood estimation when data break the assumption of multivariate normality (Kline, 2005), such as with dichotomous indicators (see also Flora & Curran, 2004). This dissertation involved the analysis of scores on several dichotomous indicators (e.g., insurance/no insurance, worried about food/not worried about food), introducing non-normality to the relationships among scores on variables. Note that with versions of Mplus prior to 6.0, WLSMV estimation yields adjusted degrees of freedom, that is, degrees of freedom that are corrected to obtain a correct *p* value and do not reflect the traditional method for calculating degrees of freedom in SEM (Muthén, 2011).

The default in Mplus for handling missing data in exploratory and confirmatory factor analysis, and in structural equation modeling, is to estimate the model under missing data theory using all available data. That is, Mplus provides maximum likelihood

estimation by default when individual data are used and missing data points are specified as missing (Muthén & Muthén, 2010).

PART I: MEASUREMENT MODELS. Part I consisted of a series of measurement models whose estimates allowed me to make tentative conclusions about the nature of various aspects of SES among unique social groups. Specifically, Part I consisted of a series of exploratory factor analyses (EFAs) performed across all participants, using the exploratory sample, to address Research Question 1; and a series of confirmatory factor analysis (CFAs) performed by social group, using the cross-validation sample, to address Research Question 2.

Research Question 1: What is the factor structure of aspects of SES in young adulthood according to EFAs? I hypothesized that items would load as shown in Table 2. My rationale was that occupational rank, educational attainment, and financial resources factors are conceptualized as related yet distinct objective aspects of SES (APA, 2007; Oakes & Rossi, 2003; Huston et al., 1994). The psychological factors of perceived control, perceived SES, and financial strain, then, have been shown to have effects on health above and beyond objective SES indicators (Grundy & Holt, 2001; Adler et al., 2000; Adler & Snibbe, 2003; Ostrove et al., 2000; Matthews et al., 2005), suggesting significant non-overlap between these psychological factors and the objective SES factors in predicting health (APA, 2007). Moreover, perceived control, perceived SES, and financial strain are theoretically distinct from each other, each having its own body of research and theory.

The analysis used to answer Research Question 1 was to perform a series of EFAs run across all participants in Mplus using the exploratory sample. First, I performed an

EFA, using principal axis factoring, on data for all Wave IV items listed in Table 2. Then, I performed EFAs, using principal axis factoring, for each separate construct measured by Wave IV data that is listed in Table 2. Items that loaded at .3 or higher in this latter analysis were retained on the factor. When factor analyses revealed that a construct I presumed to be a single factor actually reflected more than one factor, the additional factor was retained for use in subsequent structural models.

Research Question 2: Are the results of the EFAs from Research Question 1 replicable in CFAs run across all participants and in each separate social group? Is there support for measurement invariance of these constructs across social groups? I hypothesized that, yes, the factor structures found by the EFAs performed for Research Question 1 would reflect the nature of Occupational Rank, Financial Resources, Financial Strain, and Perceived Control factors found in results from CFAs run across all participants and in each of the six social groups. However, I did not expect to find support for measurement invariance across social groups for all of these constructs. In particular, I hypothesized that the factor structure of Financial Resources would differ by race due to differences in loading of the Home Ownership item across social groups, with loading of the item higher among ethnic minority groups (Blacks and Latinos). My rationale was that there was no reason to expect constructs to differ in their measurement across social groups, except that contemporary theory on SES names a home as an important asset that can be "tapped into" in times of financial strain, such when one sends children to college. However, certain social groups—Black Americans in particular—have faced difficulty in owning a home, even with sufficient personal earnings, partially due to discrimination

(APA, 2007; Altonji et al., 2000; Conley, 1999; Oliver & Shapiro, 1995). Because of this difficulty, owning a home may mark a particularly higher social standing among ethnic minority groups.

The analysis used to answer Research Question 2 was to first perform CFAs in Mplus for the Occupational Rank, Financial Resources, Financial Strain, and Perceived Control constructs across all participants in the cross-validation sample. After running these CFAs, model fit and items loadings were checked. Next, I performed the CFAs separately by gender, then by race/ethnicity, and then for each of the six social groups, using the cross-validation sample, checking model fit for each social group. Last, I tested whether there was support for measurement invariance for each factor, using the steps laid out by Horn and McArdle (1992)—first by gender, then by race/ethnicity, and last across all six groups.

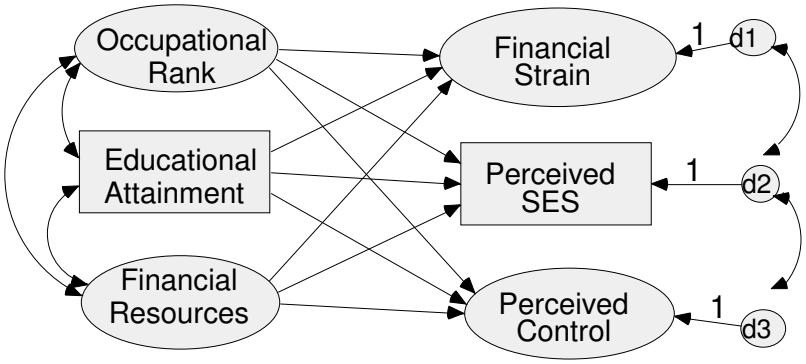
Because I did not expect to find support for measurement invariance of all constructs across groups, I expected that I would not be able to test for structural invariance in subsequent models. I instead planned to estimate structural models separately in each social group. According to Keith (2006), if constructs have different meaning across groups, then it is illogical to test whether effects of constructs on each other are the same across groups.

PART II: STRUCTURAL MODELS. Part II consisted of structural analyses of the links among traditional aspects of SES (Occupational Rank, Educational Attainment, and Financial Resources) and the psychological variables/constructs (Financial Strain, Perceived SES, and Perceived Control), using SEM techniques in Mplus. Analyses were

performed across all participants using the exploratory sample to address Research Question 3. Results were replicated across all participants using the cross-validation sample, then models were estimated separately by social group, to address Research Question 4. On the whole, the structural models estimated in Part II allowed me to make tentative conclusions about the relations of traditional aspects of SES and the psychological variables among Black, Latino/a and White young adult men and women in the U.S.

The structural model was expected to conform to Figure 1, in which traditional aspects of SES (Occupational Rank, Educational Attainment, and Financial Resources) are theorized to set up psychological and perceptual tendencies (i.e., the mediators of Financial Strain, Perceived SES, and Perceived Control; Angell, 1993; Adler et al., 1994; Adler & Snibbe, 2003; Matthews et al., 2010). Note that the configuration of the structural model depends on results from Part I, in terms of which items load onto the latent constructs, and how many factors are used in the model. In other words, the structural model may contain more than six, fewer than six, or exactly six latent variables, depending on the results from Part I.

Figure 1. Structural Model Linking Aspects of SES and the Psychological Variables



Note: Items loading onto factors are omitted for ease of presentation.

Research Question 3: What are the structural links of Young Adulthood Occupational Rank, Educational Attainment, and Financial Resources with each other, and with Financial Strain, Perceived SES, and Perceived Control, in the exploratory sample? I hypothesized that Occupational Rank, Educational Attainment, and Financial Resources would be positively correlated with each other. Each of these objective indicators of SES was expected to be positively related to Perceived SES and Perceived Control, with Perceived Control most strongly related to Occupational Rank. The relationship of Occupational Rank, Educational Attainment, and Financial Resources with Financial Strain was left as an open question.

My rationale was that across social groups, occupational rank, educational attainment, and financial resources are typically positively related (although among ethnic minorities, these correlations have been found to be about zero in some samples; e.g., Chen et al., 2004). Higher SES, according to these "objective" SES criteria, generally result in higher levels of Perceived SES (e.g., Goodman et al., 2000) and Perceived Control (e.g., APA, 2007; Karasek & Theorell, 1990; Marmot et al., 1997;

Adler & Snibbe, 2003). On the other hand, among young adults, higher SES according to these "objective" SES criteria, may or may not lead to lower levels of Financial Strain, given that pursuing postsecondary education postpones payoff until the additional credential is received (Mirowsky & Ross, 2003). Thus, in young adulthood, higher SES may not imply less financial strain.

The analysis used to answer Research Question 3 was to analyze the model shown in Figure 1 across all participants in the exploratory sample. Loadings of items onto constructs and exact number of constructs in the model depend on results from Research Questions 1 and 2. In the case that fit of the model to the data was not good, I planned to add theoretically defensible paths and correlations as suggested by SEM modification indices.

Research Question 4: Does the structural model found in exploratory analysis fit well in the cross-validation sample, across all participants and in each social group? Is there structural equivalence of the model across social groups? First, I hypothesized that the structural model determined in the exploratory sample would also fit well in the cross-validation sample. Second, I hypothesized that the model would fit the data for each social group. Third, I did not expect to find support for structural equivalence across social groups.

My rationale was that the exploratory and cross-validation samples would be generated at random, and are thus expected to have similar relationships among scores on their variables. As such, results are not expected to differ between these two samples. The model was expected to fit in each social group, but without structural equivalence of the

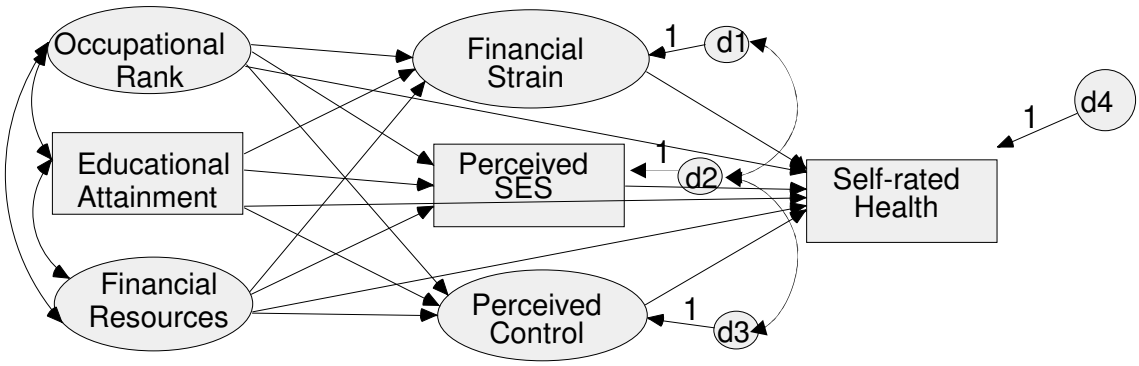
model across social groups, first, because I did not expect to find measurement invariance for all constructs across racial/ethnic groups; second, because occupational rank, educational attainment, and financial resources are not linked in the same ways for different genders and for different racial/ethnic groups (with weaker correlations for women and ethnic minorities; Williams, 2002; APA, 2007; Chen et al., 2004); and third, because research shows that different social groups garner a sense of perceived control from different aspects of their lives (Bruce & Thornton, 2004). For example, men are expected to derive a greater sense of perceived control from higher levels of income, while women are thought to derive greater perceived control from education. This suggests that relationships among traditional aspects of SES, and between traditional aspects of SES and the psychological variables, are not the same for all groups.

The analysis used to answer Research Question 4 was to first analyze the structural model in the cross-validation sample in Mplus across all participants, then check model fit and the direction and strength of paths. Second, I planned to estimate the model separately by social group then perform multi-group SEM analyses to test for structural equivalence where appropriate. This means that I would compare the fit of a model with paths allowed to be freely estimated in each group with the fit of a model with paths constrained to be equal across groups. If the drop in fit due to this constraint was significant according to a change in Chi-square statistic, then this would indicate lack of support for structural equivalence.

PART III: PREDICTIVE MODELS. Part III consisted of predictive models linking Occupational Rank, Educational Attainment, Financial Resources, Financial

Strain, Perceived SES, and Perceived Control constructs/variables with the outcome of Self-rated Health, using SEM techniques (see Figure 2). To address Research Question 5, the model was estimated in both exploratory and cross-validation samples, across all participants; it was also estimated separately by social group in the cross-validation sample. Potential mediation among these variables was addressed in Research Question 6, across all participants and in each separate social group. Finally, potential confounding variables were explored in Research Questions 7a and 7b. As a whole, the predictive models estimated in Part III allowed me to make tentative conclusions about the direct and indirect effects of aspects SES on Self-rated Health among young adults.

Figure 2. Predictive Model Linking Aspects of SES and the Psychological Variables with Each Other and with Self-rated Health



Note: Items loading onto factors are omitted for ease of presentation.

Research Question 5: What is the direct effect of each traditional aspect of SES and each of the psychological variables on Self-rated Health in young adulthood? Are these effects equivalent across social groups? I hypothesized that all factors/variables in

the model would have significant, positive direct effects on Self-rated Health, except for Financial Strain, which was expected to have a significant, negative effect on Self-reported Health. Among the six separate social groups, I expected to find the same results, except for one effect: Perceived Control was not expected to have a positive effect on Self-rated Health for African Americans. I expected to find this result in both exploratory and cross-validation samples. As noted in previous hypotheses, I did not expect to find structural equivalence of the model across social groups.

My rationale for these hypotheses was that each of the traditional components of SES (occupational rank, educational attainment, and financial resources) is thought to have a positive association with health (Mirowsky & Ross, 2003; Angell, 1993; Adler & Snibbe, 2003). Studies also show that higher levels of perceived SES and perceived control are also associated with better health, even when controlling for "objective" aspects of SES (Goodman et al., 2001; Mirowsky & Ross, 2003). Finally, financial strain is thought to increase perceived stress and thus decrease health (APA, 2007). However, the effect of perceived control on health may not be the same for all groups. Particularly, some posit that feelings of external control are not maladaptive for disempowered groups, particularly African Americans (see Graham, 1994). I did not expect to find support for structural equivalence across groups because I did not expect to find measurement invariance across groups in previous analyses, and because links among aspects of SES and the psychological variables are likely to be different for different groups. Specifically, occupational rank, educational attainment, and financial resources are expected to correlate more weakly for females and ethnic minorities than for men and

Whites (APA, 2007; Williams, 2002; Chen et al., 2004); and social groups are thought to derive their sense of perceived control from different aspects of their socioeconomic status (educational attainment for females and ethnic minorities, financial resources for males; Bruce & Thornton, 2004).

The analysis used to answer Research Question 5 was to estimate the predictive model, across all participants, first in the exploratory sample, then in the cross-validation sample, and examine the direct paths between each variable/construct and Health. I also explored the effect of applying longitudinal grand sample weights to the results. Longitudinal sampling weights were chosen because subsequent analysis would add Wave I variables to the model, so that the model was estimated based on data from both Wave I and Wave IV. Applying sampling weights was not expected to change the results, but only strengthen my ability to generalize the results to the population of young adults in the U.S. I then estimated the predictive model separately for each social group, using the cross-validation sample.

Research Question 6: Do Financial Strain, Perceived SES, and Perceived Control factors/variables mediate the effect of Young Adulthood Occupational Rank, Educational Attainment, and Financial Resources on Self-rated Health? I hypothesized that significant indirect paths would exist, though I did not hypothesize which specific mediating paths would be significant for each social group. However, Perceived Control was not expected to operate as a mediator for African Americans in the same way as it did for White Americans. My rationale for expecting mediation was that researchers and theorists argue that SES affects health not simply through lack of

material means, but through psychological mediators (Angell, 1993; Adler et al., 1994; Adler & Snibbe, 2003). Also, as explained, psychological control has been seen to operate differently for African Americans, compared to Whites (Graham, 1994; see Skinner, 1996).

The analysis used to answer Research Question 6 was to examine the significance and direction of the indirect paths of Occupational Rank, Educational Attainment, and Financial Resources factors/variables on Self-reported Health though Financial Strain, Perceived SES, and Perceived Control (the potential mediators). This was done with data from the cross-validation sample, first across all participants, then for each separate social group.

Research Question 7a: Do the effects of Young Adulthood Occupational Rank, Educational Attainment, Financial Resources, Financial Strain, Perceived SES, and Perceived Control factors/variables persist when controlling for IQ? I hypothesized that direct and indirect effects of Occupational Rank, Educational Attainment, Financial Resources, Financial Strain, Perceived SES, and Perceived Control on Self-rated Health would persist even when controlling for IQ. My rationale was that effort and individual choice affect SES and health above and beyond the deterministic effects of IQ, as suggested by the life course perspective (Elder, 1985, 1994).

The analysis used to answer Research Question 7a was to add IQ as a control variable in final predictive model estimated across all participants in the cross-validation sample. IQ was measured using score on the Add Health Picture Vocabulary Test (AHPVT), an abridged version of the Peabody Picture Vocabulary Test used in Add

Health as an indicator of intelligence. Direct and indirect effects in the model were re-examined for their direction and significance after adding in IQ as a control variable or common cause.

Research Question 7b: Are the effects of Young Adulthood Occupational Rank, Educational Attainment, Financial Resources, Financial Strain, Perceived SES, and Perceived Control factors/variables moderated by Childhood SES? I hypothesized that direct effects of Occupational Rank, Educational Attainment, and Financial Resources on Health *would* be moderated by Childhood SES, but that direct effects of Financial Strain, Perceived SES, and Perceived Control *would not* be moderated by Childhood SES. My rationale was the effect of young adulthood SES on young adulthood health is not thought to be the same for individuals of all childhood socioeconomic backgrounds (McLoyd, 1998; Wills et al., 1995) because of the severe and long-lasting effects that are associated with the health problems more typically experienced by the low-SES child (e.g., greater prevalence of birth defects, disabilities, AIDS, biological embedding of vulnerabilities in the central nervous system; Crooks, 1995; Hawley & Disney, 1992; U.S. Dept. Health & Human Services, 2000b; Cassady et al., 1997; Vrijheid et al., 2000; Wasserman et al., 1998). For young adults who experienced these severe health problems in childhood, health in young adulthood may depend less on aspects of current SES (in young adulthood) because poor health is already incurred. However, for young adults from higher-SES families, who did not experience the health problems associated with low SES in childhood, current health status may depend more on current SES. In

contrast, there is no reason to think that psychological mediators work differently for young adults with different childhood SES backgrounds.

The analysis used to answer Research Question 7b was to estimate two additional models that built from the final predictive model which was estimated across all participants in the cross-validation sample and had sampling weights applied. In the first model, I added an interaction between Parental Education and Young Adulthood Education, as well as the main effect for Parental Education. In the second model, I added an interaction between Family Income to Needs Ratio in childhood and the Household Income item from Wave IV, along with the main effect for Family Income to Needs Ratio. No interaction for occupation terms was created because parental respondents in Add Health did not provide information on their occupational status. Significant interactions were probed by categorizing one variable in the interaction (the marker of parental SES), to be used as a grouping variable; then plotting mean scores for the dependent variable (Self-rated Health) on the y-axis by levels of the other variable in the interaction (the marker of young adulthood SES) on the x-axis, separately for each group (see Keith, 2006).

Chapter 8: Results: Preliminary Analyses

This section of this dissertation discusses preparation of the data prior to testing of the main research questions. First, I present a check of the data for extreme skew and kurtosis on all variables to be used in the measurement and structural models. Next, I present tables of means, standard deviations, and correlations, which were used to describe the overall makeup of the sample and to examine whether all values for these variables seemed valid. Then, I present the application of filters to the data, and describe differences in the makeup of the sample due to the application of these filters. Last, I present the division of the data into two halves—the exploratory sample and the cross-validation sample—and an examination of these halves of the data for their equivalence on basic descriptive variables.

Data Cleaning

Prior to testing of the main hypotheses, I examined means, standard deviations, and skew and kurtosis statistics for all variables to be used in the measurement and structural models. According to Kline (2005) unstandardized skew statistics can be interpreted as z-values, but this may be a less useful way of interpreting skew statistics in large data sets, where small departures from normality can be significant. Instead, absolute values of the skew index that are larger than 3.0 can be labeled "extremely skewed" (see Curran, West, & Finch, 1997). A comparable rule of thumb for kurtosis is that absolute values of kurtosis statistics above 8.0 or 10.0 can suggest a problem, though some rely on a value as low as 3.0 to indicate kurtosis (Kline, 2005).

Using these rules of thumb, three variables had sizable skew and/or kurtosis: Personal Earnings at Wave IV, skew = 12.10, kurtosis = 239.41; Family Household Income reported by the parental respondent at Wave I skew = 8.21, kurtosis = 108.20; and Hours Worked at Wave IV, kurtosis = 6.58. These were also items that which had a much larger range and standard deviation than other items to be used in the measurement and structural models: range from 0 to 999,995 for Personal Earnings; range from 0-999, marking thousands, for Family Household Income; range from 10-168 for Hours Worked. For all other variables to be used in the models, absolute skew and kurtosis values were less than 3.0, and the widest range was 1 to 13 (except for score on the Add Health Picture Vocabulary test, which ranged from 14 to 146 but had very small skew and kurtosis statistics).

To correct for skew and kurtosis, two of these items were transformed using a natural log transformation prior to data analysis: Personal Earnings and Hours Worked. (Household Income reported by the parental respondent was not transformed because it was to be used in calculating a Family Income to Needs Ratio for each respondent, for which its original scale was important to retain.) After the transformations, these items had skew and kurtosis statistics as follows: skew = -2.82 and kurtosis = 7.06 for Personal Earnings; skew = -1.57 and kurtosis = 5.11 for Hours Worked. Table 3 shows means, standard deviations, minimums, and maximums for all items used in this dissertation, and Table 4 shows means and standard deviations by social group. Tables 5 through 10 show Pearson's *r* intercorrelations among variables to be used in the measurement and structural models.

Table 3

Means, Standard Deviations, Minimums, and Maximums for Items Used in Measurement and Structural Models

Construct / Item		*M*	*SD*	Min	Max	*N*
Occup. Rank:	Hours worked per week	41.12	11.33	10.00	168.00	8339
	Log of hours worked per week	3.67	0.31	2.30	5.12	8339
	How physical is job	2.94	1.07	1.00	4.00	6830
	Freedom to make decisions at work	2.88	0.95	1.00	4.00	8337
	Repetitiveness of job (r)	2.10	0.92	1.00	4.00	8338
	Level of supervisory role at job	1.46	0.66	1.00	3.00	8340
	Job satisfaction	3.86	0.94	1.00	5.00	8339
	Degree job fits with career goals	2.97	0.98	1.00	4.00	8337
	Job provides health insurance	0.73	0.44	0.00	1.00	8329
	Job provides retirement benefits	0.66	0.47	0.00	1.00	8285
	Job provides pd vacation/sick time	0.74	0.44	0.00	1.00	8327
Ed. Attainment:	Highest level of educ, credentials	5.72	2.18	1.00	3.00	8449
Fin. Resources:	Household income (12-pt scale)	8.09	2.58	1.00	12.00	7884
	Pers earnings, dollars	34,063.95	41,681.34	0.00	999,995	8050
	Log of personal earnings	9.47	2.71	0.00	3.82	8050
	Own/in process of owning a home	0.41	0.49	0.00	1.00	8437
	Household assets (9-pt scale)	3.68	1.95	1.00	9.00	7578
Financial Strain:	Without phone service	0.09	0.28	0.00	1.00	8445
	Didn't pay rent/mortgage	0.09	0.28	0.00	1.00	8438
	Evicted from for not paying	0.01	0.09	0.00	1.00	8446
	Didn't pay full gas/electric/oil bill	0.14	0.35	0.00	1.00	8439
	Gas/electric turned off	0.05	0.21	0.00	1.00	8445
	Worried food would run out	0.10	0.31	0.00	1.00	8445
Perceived SES:	MacArthur ladder of Subj. SES	5.03	1.72	1.00	0.00	8432
Perc. Control:	Unable to control things (r)	3.76	1.08	1.00	5.00	8443
	Confident in abil to handle probs	4.09	0.96	1.00	5.00	8448
	Things are going your way	3.58	0.92	1.00	5.00	8447
	Couldn't overcome difficulties (r)	3.81	1.03	1.00	5.00	8444
	Can do little to change things (r)	2.02	0.77	1.00	5.00	8426
	Others determine what can do (r)	1.86	0.77	1.00	5.00	8435
	Things interfere with wants (r)	2.62	0.99	1.00	5.00	8431
	Have little control over things (r)	2.07	0.77	1.00	5.00	8429
	No way to solve problems (r)	1.87	0.66	1.00	5.00	8433
Self-rated health		3.67	0.92	1.00	5.00	8451
WI PVT Score		101.08	14.15	14.00	146.00	8104
Childhood SES:	Parent's level of education	5.72	2.27	0.00	9.00	7599
	WI yrly fam. inc., dollars, thousands	47.26	52.60	0	999.00	6736
	WI poverty status	0.09	0.28	0.00	1.00	7608
	Number of persons in household	3.60	1.55	0.00	14.00	8451

Note. Items are drawn from Wave IV unless otherwise marked. Reversed items are marked with "(r)".

Table 4

Means, Standard Deviations, Minimums, and Maximums for Items Used in Measurement and Structural Models, by Social Group

		Black Men	Latino Men	White Men	Black Women	Latina Women	White Women
Variable		*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*	*M* *(SD)*
Occup. Rank:	Hours worked per week	42.05 (12.28)	43.55 (10.09)	44.69 (11.89)	38.90 (9.66)	38.93 (8.77)	38.71 (11.14)
	Log of hours worked per week	3.69 (0.33)	3.74 (0.25)	3.76 (0.29)	3.62 (0.29)	3.63 (0.29)	3.61 (0.34)
	How physical is job	2.70 (1.15)	2.66 (1.18)	2.71 (1.19)	3.19 (0.92)	3.29 (0.90)	3.09 (0.91)
	Freedom to make decisions at work	2.84 (1.00)	2.89 (0.95)	3.00 (0.94)	2.81 (0.96)	2.75 (0.92)	2.86 (0.93)
	Repetitiveness of job (r)	1.97 (0.89)	2.11 (0.89)	2.29 (0.93)	1.79 (0.88)	1.95 (0.87)	2.13 (0.92)
	Level of supervisory role at job	1.46 (0.69)	1.50 (0.67)	1.55 (0.69)	1.37 (0.63)	1.43 (0.65)	1.40 (0.63)
	Job satisfaction	3.71 (0.98)	3.88 (0.85)	3.92 (0.93)	3.64 (1.01)	3.90 (0.90)	3.91 (0.93)
	Degree job fits with career goals	2.82 (0.95)	2.92 (0.99)	3.14 (0.97)	2.81 (0.87)	2.84 (0.96)	2.97 (1.01)
	Job provides health insurance	0.72 (0.45)	0.76 (0.43)	0.76 (0.43)	0.74 (0.44)	0.75 (0.43)	0.70 (0.46)
	Job provides retirement benefits	0.65 (0.48)	0.65 (0.48)	0.68 (0.47)	0.68 (0.47)	0.68 (0.47)	0.63 (0.48)
	Job provides pd vacation/sick time	0.69 (0.46)	0.73 (0.44)	0.74 (0.44)	0.77 (0.42)	0.79 (0.41)	0.72 (0.45)
Ed. Attainment:	Highest level of educ, credentials	5.23 (2.16)	4.98 (2.05)	5.65 (2.17)	5.90 (2.18)	5.52 (2.13)	6.09 (2.16)

Table 4 (cont'd)

		7.54	8.47	8.48	6.84	8.40	8.21
Fin. Resources:	Household income (12-pt scale)	(2.84)	(2.33)	(2.32)	(2.97)	(2.30)	(2.53)
		31,832.88	41,159.19	44,617.37	27,091.86	31,602.66	27,202.15
	Pers earnings, dollars	(34,521.98)	(47,385.41)	(55,708.64)	(34,021.93)	(39,830.73)	(26,059.44)
		9.40	10.12	10.20	9.30	9.22	8.84
	Log of personal earnings	(2.67)	(1.74)	(1.72)	(2.58)	(3.03)	(3.32)
		0.24	0.34	0.46	0.25	0.37	0.50
	Own/in process of owning a home	(0.43)	(0.47)	(0.50)	(0.43)	(0.48)	(0.50)
		3.64	3.95	4.00	2.93	3.59	3.67
	Household assets (9-pt scale)	(1.95)	(1.99)	(1.88)	(1.80)	(2.01)	(1.96)
		0.11	0.07	0.06	0.17	0.10	0.07
Financial Strain:	Without phone service	(0.31)	(0.26)	(0.24)	(0.37)	(0.31)	(0.26)
		0.11	0.08	0.07	0.13	0.08	0.09
	Didn't pay rent/mortgage	(0.32)	(0.27)	(0.25)	(0.33)	(0.28)	(0.28)
		0.02	0.01	0.01	0.01	0.01	0.01
	Evicted from for not paying	(0.15)	(0.08)	(0.08)	(0.11)	(0.10)	(0.08)
		0.15	0.07	0.12	0.23	0.13	0.15
	Didn't pay full gas/electric/oil bill	(0.36)	(0.25)	(0.32)	(0.42)	(0.34)	(0.36)
		0.07	0.03	0.04	0.07	0.06	0.04
	Gas/electric turned off	(0.26)	(0.18)	(0.20)	(0.26)	(0.24)	(0.19)
		0.10	0.07	0.08	0.16	0.11	0.11
	Worried food would run out	(0.30)	(0.26)	(0.27)	(0.37)	(0.31)	(0.31)
		4.79	5.08	5.14	4.82	5.07	5.07
Perceived SES:	MacArthur ladder of Subj. SES	(1.81)	(1.67)	(1.71)	(1.75)	(1.70)	(1.71)
		3.77	3.88	3.87	3.67	3.72	3.67
Perc. Control:	Unable to control things (r)	(1.15)	(1.07)	(1.03)	(1.12)	(1.06)	(1.09)
		4.19	4.09	4.19	4.01	3.95	4.05
	Confident in abil to handle probs	(0.95)	(1.06)	(0.94)	(0.97)	(1.00)	(0.92)
		3.47	3.59	3.63	3.50	3.60	3.59
	Things are going your way	(0.97)	(0.94)	(0.90)	(0.92)	(0.92)	(0.92)
		3.77	3.89	3.95	3.62	3.74	3.80
	Couldn't overcome difficulties (r)	(1.11)	(0.99)	(0.96)	(1.09)	(1.04)	(1.04)
		2.07	2.06	2.04	1.99	2.05	1.99
	Can do little to change things (r)	(0.90)	(0.79)	(0.76)	(0.84)	(0.80)	(0.69)

Table 4 (cont'd)

		1.90	1.88	1.92	1.73	1.86	1.85
	Others determine what can do (r)	(0.88)	(0.75)	(0.77)	(0.76)	(0.76)	(0.73)
		2.75	2.56	2.71	2.53	2.48	2.60
	Things interfere with wants (r)	(1.09)	(0.99)	(0.97)	(1.03)	(0.95)	(0.96)
		2.14	2.12	2.07	2.01	2.12	2.06
	Have little control over things (r)	(0.93)	(0.78)	(0.74)	(0.81)	(0.79)	(0.71)
		1.86	1.90	1.85	1.85	1.92	1.86
	No way to solve problems (r)	(0.74)	(0.68)	(0.67)	(0.69)	(0.69)	(0.61)
		3.70	3.57	3.76	3.55	3.50	3.71
Self-rated health		(0.95)	(0.95)	(0.90)	(0.95)	(1.00)	(0.89)
		94.79	95.38	106.58	93.84	93.43	104.52
WI PVT Score		(14.49)	(14.66)	(11.85)	(13.70)	(15.54)	(12.06)
		6.10	4.16	6.05	5.75	4.03	6.03
Childhood SES:	Parent's level of education	(2.07)	(2.65)	(3.44)	(2.30)	(2.57)	(2.02)
		36.54	36.49	52.56	35.11	36.64	54.54
	WI yrly fam. inc., dollars, thousands	(36.30)	(44.28)	(52.01)	(36.03)	(45.66)	(61.85)
		0.14	0.13	0.05	0.18	0.12	0.06
	WI poverty status	(0.34)	(0.33)	(0.21)	(0.38)	(0.32)	(0.24)
		3.56	4.05	3.36	3.83	4.27	3.42
	Number of persons in household	(1.56)	(1.84)	(1.30)	(1.92)	(1.87)	(1.30)

Note. Items are drawn from Wave IV unless otherwise marked. Reversed items are marked with "(r)".

Table 5

Pearson's Intercorrelations between Variables Used in Measurement and Structural Models

Measure	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
1. Household income (12-pt scale)	-												
2. Pers earnings, dollars, thousands	.31*	-											
3. Own/in process of owning a home	.26*	.07*	-										
4. Household assets (9-pt scale)	.52*	.16*	.22*	-									
5. Without phone service	-.29*	-.12*	-.12*	-.23*	-								
6. Didn't pay rent/mortgage	-.19*	-.06*	-.06*	-.19*	.41*	-							
7. Evicted from for not paying	-.10*	-.02	-.03*	-.06*	.18*	.23*	-						
8. Didn't pay full gas/electric/oil bill	-.25*	-.09*	-.09*	-.23*	.40*	.44*	.15*	-					
9. Gas/electric turned off	-.15*	-.07*	-.07*	-.13*	.33*	.32*	.17*	.42*	-				
10. Worried food would run out	-.27*	-.11*	-.11*	-.23*	.38*	.36*	.14*	.37*	.24*	-			
11. MacArthur Ladder of Subj. SES	.33*	.15*	.18*	.29*	-.21*	-.18*	-.08*	-.24*	-.13*	-.23*	-		
12. Highest level of educ, credentials	.29*	.17*	.10*	.17*	-.19*	-.13*	-.07*	-.14*	-.10*	-.14*	.34*	-	
13. Hours worked per week	.20*	.18*	.08*	.11*	-.05*	-.05*	-.01	-.06*	-.03*	-.05*	.11*	.04*	-
M	8.09	9.47	.41	3.68	.09	.09	.01	.14	.05	.10	5.03	5.72	3.67
SD	2.58	2.71	.49	1.95	.28	.28	.09	.35	.21	.31	1.72	2.18	.31
N	7884	8050	8437	7578	8445	8438	8446	8439	8445	8445	8432	8449	8339

Note. Correlations and *N*s are pairwise statistics.
*$p < .05$.

Table 6

Pearson's Intercorrelations between Variables Used in Measurement and Structural Models (cont'd)

Measure	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*
1. Household income (12-pt scale)	.18*	.17*	.19*	.12*	.15*	.28*	.25*	.26*	.25*	.14*	.16*	.20*
2. Pers earnings, dollars, thousands	.06*	.15*	.13*	.10*	.09*	.25*	.23*	.22*	.23*	.09*	.08*	.11*
3. Own/in process of owning a home	.03*	.12*	.09*	.07*	.12*	.15*	.08*	.10*	.10*	.12*	.10*	.13*
4. Household assets (9-pt scale)	.09*	.14*	.12*	.10*	.11*	.19*	.11*	.13*	.10*	.12*	.13*	.16*
5. Without phone service	-.07*	-.09*	-.11*	-.02	-.07*	-.11*	-.11*	-.11*	-.11*	-.19*	-.14*	-.18*
6. Didn't pay rent/mortgage	-.05*	-.06*	-.08*	-.03*	-.08*	-.10*	-.08*	-.09*	-.10*	-.17*	-.10*	-.16*
7. Evicted from for not paying	-.05*	-.02	-.03*	.01	-.02	-.04*	-.03*	-.03*	-.04*	-.08*	-.07*	-.06*
8. Didn't pay full gas/electric/oil bill	-.06*	-.08*	-.12*	-.04*	-.09*	-.10*	-.09*	-.10*	-.09*	-.19*	-.12*	-.18*
9. Gas/electric turned off	-.06*	-.05*	-.07*	-.00	-.05*	-.07*	-.06*	-.08*	-.07*	-.12*	-.07*	-.11*
10. Worried food would run out	-.08*	-.09*	-.10*	-.04*	-.11*	-.11*	-.09*	-.11*	-.10*	-.22*	-.15*	-.19*
11. MacArthur Ladder of Subj. SES	.14*	.18*	.20*	.10*	.22*	.27*	.16*	.17*	.16*	.22*	.18*	.27*
12. Highest level of educ, credentials	.31*	.09*	.27*	.03*	.06*	.28*	.20*	.20*	.17*	.03*	.14*	.18*
13. Hours worked per week	.00	.14*	.09*	.19*	.07*	.21*	.31*	.27*	.33*	.07*	.08*	.05*
M	2.94	2.88	2.11	1.46	3.86	2.97	.73	.66	.74	3.76	4.09	3.58
SD	1.07	.95	.92	.66	.95	.98	.44	.47	.44	1.08	.96	.92
N	6830	8337	8338	8340	8339	8337	8329	8285	8327	8443	8448	8447

Note. Correlations and *N*s are pairwise statistics. See Table 8 for a listing of variables 14-25.
*$p < .05$.

Table 7

Pearson's Intercorrelations between Variables Used in Measurement and Structural Models (cont'd)

Measure	*26*	*27*	*28*	*29*	*30*	*31*	*32*	*33*	*34*	*35*	*36*
1. Household income (12-pt scale)	.21*	-.14*	-.14*	-.15*	-.15*	-.15*	.16*	.17*	-.19*	.14*	.16*
2. Pers earnings, dollars, thousands	.09*	-.06*	-.09*	-.08*	-.08*	-.08*	.11*	.08*	-.08*	.09*	.08*
3. Own/in process of owning a home	.13*	-.05*	-.06*	-.09*	-.08*	-.04*	.04*	.13*	-.10*	.12*	.10*
4. Household assets (9-pt scale)	.16*	-.10*	-.09*	-.10*	-.09*	-.10*	.12*	.16*	-.12*	.12*	.13*
5. Without phone service	-.22*	.10*	.08*	.14*	.12*	.10*	-.11*	-.14*	.11*	-.19*	-.14*
6. Didn't pay rent/mortgage	-.21*	.07*	.05*	.12*	.06*	.07*	-.05*	-.13*	.07*	-.17*	-.10*
7. Evicted from for not paying	-.10*	.06*	.07*	.05*	.06*	.06*	-.03*	-.06*	.03*	-.08*	-.07*
8. Didn't pay full gas/electric/oil bill	-.22*	.06*	.04*	.14*	.06*	.06*	-.05*	-.15*	.07*	-.19*	-.12*
9. Gas/electric turned off	-.15*	.05*	.03*	.08*	.03*	.05*	-.03*	-.09*	.06*	-.12*	-.07*
10. Worried food would run out	-.26*	.08*	.09*	.17*	.10*	.10*	-.06*	-.16*	.08*	-.22*	-.15*
11. MacArthur Ladder of Subj. SES	.24*	-.13*	-.14*	-.23*	-.16*	-.15*	.15*	.25*	-.10*	.22*	.18*
12. Highest level of educ, credentials	.14*	-.21*	-.20*	-.15*	-.17*	-.20*	.38*	.22*	-.19*	.03*	.14*
13. Hours worked per week	.06*	-.04*	-.02	-.02	-.04*	-.03*	.01	.02*	-.04*	.07*	.08*
M	3.81	2.02	1.86	2.62	2.07	1.87	5.72	3.67	.09	3.56	101.09
SD	1.03	.77	.77	1.00	.77	.66	2.27	.92	.28	.84	14.15
N	8444	8426	8435	8431	8429	8433	7599	8451	7608	6736	8104

Note. Correlations and *N*s are pairwise statistics. See Table 10 for a listing of variables 26-36.
*$p < .05$.

Table 8

Pearson's Intercorrelations between Variables Used in Measurement and Structural Models (cont'd)

Measure	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*
14. How physical is job	-											
15. Freedom to make decisions at work	.04*	-										
16. Repetitiveness of job (r)	.11*	.12*	-									
17. Level of supervisory role at job	-.06*	.25*	.10*	-								
18. Job satisfaction	.02	.30*	.17*	.10*	-							
19. Degree job fits with career goals	.08*	.27*	.25*	.14*	.38*							
20. Job provides health insurance	.15*	.06*	.11*	.05*	.08*	.22*	-					
21. Job provides retirement benefits	.15*	.06*	.10*	.03*	.11*	.24*	.73*	-				
22. Job provides pd vacation/sick time	.17*	.10*	.09*	.07*	.10*	.23*	.70*	.66*	-			
23. Unable to control things (r)	.00	.12*	.09*	.04*	.20*	.12*	.09*	.10*	.09*	-		
24. Confident in abil to handle probs	.05*	.14*	.08*	.05*	.12*	.13*	.09*	.09*	.08*	.34*	-	
25. Things are going your way	.11*	.15*	.10*	.03*	.21*	.18*	.11*	.13*	.12*	.37*	.43*	-
M	2.94	2.88	2.11	1.46	3.86	2.97	.73	.66	.74	3.76	4.09	3.58
SD	1.07	.95	.92	.66	.95	.98	.44	.47	.44	1.08	.96	.92
N	6830	8337	8338	8340	8339	8337	8329	8285	8327	8443	8448	8447

Note. Correlations and *N*s are pairwise statistics. Reversed items are marked with "(r)".
$^{*}p < .05$.

Table 9

Pearson's Intercorrelations between Variables Used in Measurement and Structural Models (cont'd)

Measure	*26*	*27*	*28*	*29*	*30*	*31*	*32*	*33*	*34*	*35*	*36*
14. How physical is job	.06*	-.12*	-.12*	-.08*	-.09*	-.10*	.13*	.04*	-.07*	.17*	.13*
15. Freedom to make decisions at work	.11*	-.12*	-.13*	-.12*	-.14*	-.12*	.07*	.09*	-.06*	.05*	.07*
16. Repetitiveness of job (r)	.13*	-.07*	-.07*	-.10*	-.09*	-.09*	.15*	.15*	-.11*	.19*	.22*
17. Level of supervisory role at job	.03*	-.04*	-.03*	-.01	-.04*	-.03*	.03*	.02	-.01	.03*	.03*
18. Job satisfaction	.16*	-.04*	-.06*	-.18*	-.08*	-.07*	.01	.13*	-.03*	.03*	.00
19. Degree job fits with career goals	.13*	-.11*	-.11*	-.16*	-.11*	-.13*	.13*	.14*	-.10*	.15*	.13*
20. Job provides health insurance	.10*	-.05*	-.06*	-.10*	-.08*	-.06*	.06*	.07*	-.06*	.07*	.08*
21. Job provides retirement benefits	.11*	-.07*	-.07*	-.10*	-.09*	-.07*	.06*	.08*	-.05*	.07*	.07*
22. Job provides pd vacation/sick time	.10*	-.06*	-.07*	-.09*	-.08*	-.06*	.03*	.06*	-.05*	.06*	.05*
23. Unable to control things (r)	.50*	-.10*	-.16*	-.33*	-.23*	-.15*	.00	.18*	-.00	.02	-.02
24. Confident in abil to handle probs	.31*	-.20*	-.22*	-.22*	-.21*	-.23*	.09*	.18*	-.05*	.08*	.09*
25. Things are going your way	.39*	-.19*	-.21*	-.30*	-.25*	-.23*	.09*	.22*	-.05*	.08*	.09*
M	3.81	2.02	1.86	2.62	2.07	1.87	5.72	3.67	.09	3.56	101.09
SD	1.03	.77	.77	.99	.77	.66	2.27	.92	.28	.84	14.15
N	8444	8426	8435	8431	8429	8433	7599	8451	7608	6736	8104

Note. Correlations and *N*s are pairwise statistics. See Table 10 for a listing of variables 26-36. Reversed items are marked with "(r)".

*$p < .05$.

Table 10

Pearson's Intercorrelations between Variables Used in Measurement and Structural Models (cont'd)

Measure	*26*	*27*	*28*	*29*	*30*	*31*	*32*	*33*	*34*	*35*	*36*
26. Couldn't overcome difficulties (r)	-										
27. Can do little to change things (r)	-.16*	-									
28. Others determine what can do (r)	-.17*	.46*	-								
29. Things interfere with wants (r)	-.30*	.25*	.32*	-							
30. Have little control over things (r)	-.22*	.44	.44*	.38*	-						
31. No way to solve problems (r)	-.20*	.48	.47*	.31*	.55*	-					
32. Parent's level of education	.09*	-.13	-.11*	-.04*	-.09*	-.13*	-				
33. Self-rated health	.21*	-.10	-.11*	-.18*	-.13*	-.14*	.15*	-			
34. WI poverty status	-.06*	.06*	.04*	.04*	.03*	.05*	-.25*	-.08*	-		
35. WI yrly fam inc., dollars, thous	.08*	-.11*	-.09*	-.06*	-.07*	-.10*	.42*	.11*	-.40*	-	
36. WI PVT Score	.11*	-.17*	-.13*	-.04*	-.12*	-.16*	.37*	.11*	-.18*	.32*	-
M	3.81	2.02	1.86	2.62	2.07	1.87	5.72	3.67	.09	3.56	101.09
SD	1.03	.77	.77	.99	.77	.66	2.27	.92	.28	.84	14.15
N	8444	8426	8435	8431	8429	8433	7599	8451	7608	6736	8104

Note. Correlations and *N*s are pairwise statistics. Reversed items are marked with "(r)".
$^{*}p < .05$.

Sample Selection

The sample of Add Health participants who were interviewed at Wave IV (N = 15,701) was refined with the application of two filters. First, participants had to belong to one of the three largest ethnic groups in the U.S. (non-Hispanic White, non-Hispanic Black/African American, or Latino; U.S. Census Bureau, 2008), according to their Wave III self-reported race. Applying this first filter reduced the sample by approximately 4,000 participants, for an N of 11,671. Second, participants had to possess Wave IV longitudinal weights, to be utilized in final analyses. Applying this second filter reduced the sample by approximately 3,200 participants, for a final sample size of N = 8,451. The descriptive statistics of the sample as it was refined with these filters is shown in Table 11. The sample remained relatively consistent in its composition with the application of these filters, aside from becoming slightly younger, with slightly greater proportions of non-Hispanic Whites.

The final sample included slightly more females than males (55% female). In terms of race/ethnicity, the majority of the sample was non-Hispanic White (61%), with smaller portions of non-Hispanic Blacks (22%) and Latinos (17%). Average age in the final sample was 28.65 years (SD = 1.61 years). On average, participants completed some education beyond their high school degree. "Some college" was the most frequently-chosen category for participants' level of education at Wave IV. On average, participants came from families whose parental respondents completed some education beyond their high school degree. High school diploma was the most frequently-chosen educational level among parental respondents. Approximately 9% of the sample came from families

who had qualified for public assistance at Wave I.

Table 11

Selection of Participants into the Sample

	Samples		
Variables	1	2	3
		Means (SD)	
Parental Educational Attainment[a]	5.72 (2.27)	5.72 (2.28)	5.73 (2.26)
Self Educational Attainment (Wave IV)[b]	5.72 (2.18)	5.73 (2.19)	5.72 (2.18)
Age (Wave IV)	28.65 (1.61)	28.64 (1.61)	28.65 (1.62)
		Percentages	
Gender (female)	55%	55%	55%
Non-Hispanic White	61%	62%	60%
Non-Hispanic Black	22%	21%	22%
Latino	17%	17%	18%
Childhood Public Assistance	9%	10%	8%
		Sample Size	
N	15,701	11,671	8,451

Note. The first sample included those who were interviewed at Wave IV. The second sample included those who were non-Hispanic White, non-Hispanic Black, or Latino. The third sample included those with valid Wave IV weights.

[a]Response options: 0 = no school, 1 = 8th grade or less, 2 = more than 8th grade, but no HS degree, 3 = business, trade, or vocational school instead of HS, 4 = GED, 5 = HS graduate, 6 = business, trade or vocational school after HS, 7 = went to college, but did not graduate, 8 = graduated from college/university, 9 = prof. training beyond college.

[b]Rresponse options: 1 = 8th grade or less, 2 = some HS, 3 = HS graduate, 4 = some vocational/technical school, 5 = completed vocational/technical school, 6 = some college, 7 = completed college, 8 = some graduate school, 9 = completed a master's, 10 = some graduate training beyond a master's, 11 = completed a doctoral degree, 12 = some post baccalaureate professional education, 13 = completed post baccalaureate professional education.

The final sample was then divided at random into exploratory and confirmatory samples (N = 4226 and N = 4225, respectively). Table 12 demonstrates that the exploratory and cross-validation samples were approximately equivalent in their composition, except for the cross-validation sample having slightly smaller proportions of non-Hispanic Whites (62% in the exploratory sample, 60% in the cross-validation sample) and participants from families on public assistance (10% in the exploratory sample, 8% in the cross-validation sample). Because the exploratory and cross-validation samples were roughly equivalent on basic descriptive variables, as was expected, these two halves were deemed acceptable for developing then providing confirmatory support for measurement, structural, and predictive models of the relationship between SES and health among young adults.

Table 12

Equivalence of Exploratory and Cross-Validation Samples

	Samples		
Variables	Whole	Exploratory	Cross-Validation
		Means (SD)	
Parental Educational Attainment[a]	5.72 (2.27)	5.72 (2.28)	5.73 (2.26)
Self Educational Attainment (Wave IV)[b]	5.72 (2.18)	5.73 (2.19)	5.72 (2.18)
Age (Wave IV)	28.65 (1.61)	28.64 (1.61)	28.66 (1.62)
		Percentages	
Gender (female)	55%	55%	55%
Non-Hispanic White	61%	62%	60%
Non-Hispanic Black	22%	21%	22%
Latino	17%	17%	18%
Childhood Public Assistance	9%	10%	8%
		Sample Size	
N	8,451	4,226	4,225

Note. [a]Response options: 0 = no school, 1 = 8th grade or less, 2 = more than 8th grade, but no HS degree, 3 = business, trade, or vocational school instead of HS, 4 = GED, 5 = HS graduate, 6 = business, trade or vocational school after HS, 7 = went to college, but did not graduate, 8 = graduated from college/university, 9 = prof. training beyond college. [b]Rresponse options: 1 = 8th grade or less, 2 = some HS, 3 = HS graduate, 4 = some vocational/technical school, 5 = completed vocational/technical school, 6 = some college, 7 = completed college, 8 = some graduate school, 9 = completed a master's, 10 = some graduate training beyond a master's, 11 = completed a doctoral degree, 12 = some post baccalaureate professional education, 13 = completed post baccalaureate professional education.

Chapter 9: Results: Measurement Models

The following results pertain to the measurement models that were estimated in order to answer Research Questions 1 and 2. First, I present exploratory models that examine the nature of aspects of SES among White, Black, and Latino/a men and women in the U.S. who are in young adulthood, using the exploratory sample. Then, I present confirmatory support for these models using the cross-validation sample.

Research Question 1: What is the factor structure of aspects of SES according to EFAs?

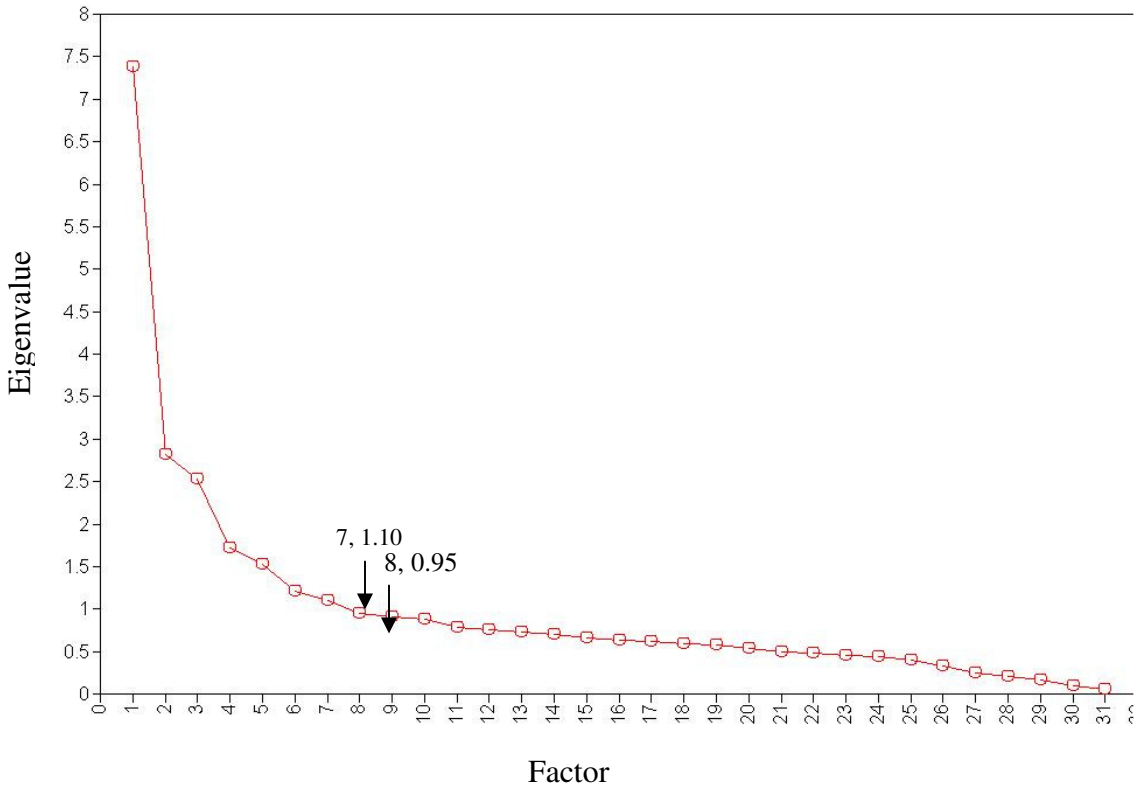
To answer Research Question 1, I performed exploratory factor analyses (EFAs) in Mplus—first for all SES items, then separately for each hypothesized SES construct. The default Mplus EFA settings were ideal for the analyses in this dissertation: *principal axis factoring* as opposed to principal components factoring (the latter of which produces factors that are mathematically perfect but less practically meaningful for applied research); *oblique rotation* (specifically, geomin rotation*)*, which allowed extracted factors to be correlated; and full information maximum likelihood estimation.

Two of the most common methods for determining the number of factors to extract in an EFA, when number of factors are not specified *a priori*, are Kaiser's rule and the use of a Scree plot. In applying Kaiser's rule, factors with Eigenvalues greater than 1.0 are retained. In contrast, when one uses a Scree plot (a plot showing extracted factors on the x-axis and Eigenvalues on the y axis), *n*-1 factors are retained in the solution, *n* being the value on the x-axis at which an "elbow" or sharp bend in the plot is seen (Kline, 2005; Stevens, 2002).

All-item EFA

First, I ran an initial EFA on all Occupational Rank, Educational Attainment, Financial Resources, Financial Strain, Perceived SES, and Perceived Control items, using data for all participants in the exploratory sample at Wave IV, in order to explore the number of underlying factors suggested by Mplus. Relying on the identification of the "elbow" in the EFA's Scree plot suggested a one-factor solution, while relying on Kaiser's rule suggested a seven-factor solution (see Figure 3).

Figure 3. Scree Plot for All-Item EFA Conducted in the Exploratory Sample



Unfortunately, a one-factor solution (relying on the Scree plot) does not provide much theoretical insight about the nature of SES, except that all of the items do relate to SES. On the other hand, it has been argued that the Kaiser's rule (the Eigenvalues greater than 1.0 rule) can result in extraction of too many factors than are practically important (Stevens, 2002). This seemed true in the current analysis, as interpretation of the factors based on item loadings was not entirely straightforward in the seven-factor solution. For example, the Personal Earnings item did not load onto any of the seven factors, and the How Physical is Job item loaded onto the same factor as the Educational Attainment item (see Table 13). Additionally, some loadings barely reached the ".30 or higher" rule of thumb for retaining items onto a factor (Stevens, 2002), including the Repetitiveness of Job item. To address the possibility that relying on Kaiser's rule produced too many factors than are practically important, I next ran EFAs for each of the hypothesized theoretical constructs, separately by construct.

Table 13

Loadings of Items According to All-item EFA Conducted in the Exploratory Sample

	F1	F2	F3	F4	F5	F6	F7
Household income (12-pt scale)	-0.05	**0.67**	0.12	0.10	0.02	-0.01	0.02
Personal earnings, dollars, thousands [a]	0.06	0.20	0.22	0.06	0.02	-0.02	0.13
Own/in process of owning a home	-0.07	**0.32**	0.01	0.01	0.10	0.04	0.10
Household assets (9-pt scale)	-0.23	**0.56**	-0.04	-0.02	-0.03	0.00	0.00
Without phone service	**0.69**	-0.19	0.00	-0.07	-0.08	0.02	0.04
Didn't pay rent/mortgage	**0.83**	-0.02	-0.04	0.06	-0.04	0.02	0.03
Evicted from for not paying	**0.72**	-0.04	-0.02	-0.04	0.01	0.17	0.15
Didn't pay full gas/electric/oil bill	**0.92**	0.02	0.02	0.04	0.02	0.00	-0.05
Gas/electric turned off	**0.86**	0.12	-0.02	-0.03	0.03	-0.03	-0.06
Worried food would run out	**0.64**	-0.15	0.03	-0.01	-0.17	-0.01	-0.03
MacArthur Ladder of Subj. SES	-0.15	0.14	0.01	0.23	0.15	0.02	0.18
Highest level of education, credentials	-0.03	0.01	0.02	**0.72**	0.00	-0.05	0.03
Hours worked per week	0.03	0.14	**0.41**	-0.16	-0.05	-0.02	0.17
How physical is job	-0.01	0.02	0.07	**0.42**	-0.01	-0.03	-0.09
Freedom to make decisions at work	0.00	0.07	-0.03	-0.06	0.03	-0.11	**0.46**
Repetitiveness of job (r)	-0.08	0.00	0.00	**0.27**	0.00	0.03	**0.25**
Level of supervisory role at job	-0.01	0.11	0.04	-0.12	-0.08	-0.05	**0.31**
Job satisfaction	-0.03	-0.11	-0.01	0.02	0.14	0.02	**0.55**
Degree job fits with career goals	0.03	0.04	0.14	0.21	-0.01	-0.02	**0.53**
Job provides health insurance	-0.02	-0.01	**0.99**	0.00	0.01	0.01	-0.02
Job provides retirement benefits	-0.01	-0.03	**0.94**	0.03	0.03	-0.01	-0.02
Job provides paid vacation/sick time	-0.01	0.01	**0.92**	0.01	0.01	0.01	0.02
Unable to control things (r)	-0.08	-0.05	0.04	-0.16	**0.68**	0.03	0.02
Confident in abil to handle problems	0.13	0.10	0.00	0.00	**0.55**	-0.09	-0.03
Things are going your way	0.06	0.06	-0.02	0.08	**0.64**	-0.03	0.02
Couldn't overcome difficulties (r)	-0.09	0.01	0.02	-0.02	**0.59**	-0.03	-0.02
Can do little to change things (r)	0.01	0.00	0.02	-0.07	0.03	**0.64**	0.01
Others determine what can do (r)	-0.04	-0.02	0.00	-0.02	-0.03	**0.64**	-0.01
Things interfere with wants (r)	0.06	0.10	0.01	-0.05	**-0.30**	**0.32**	-0.11
Have little control over things (r)	0.01	0.01	-0.03	0.05	-0.07	**0.68**	0.00
No way to solve problems (r)	0.02	0.00	0.00	0.02	0.01	**0.73**	-0.01

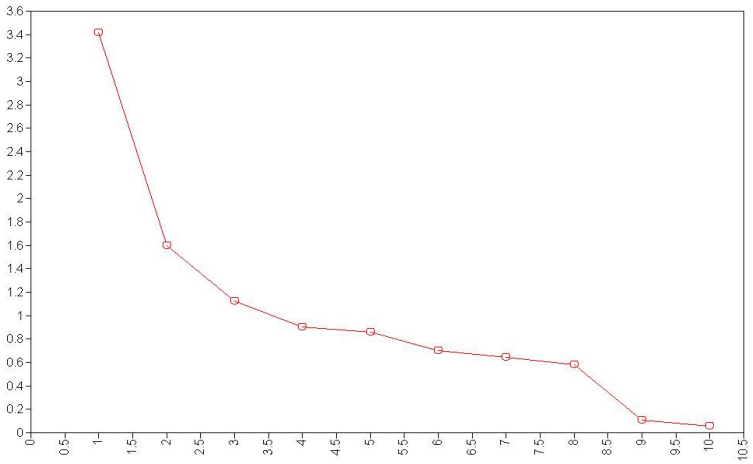
Note. Numbers represent loadings of items onto each of the seven factors. Loadings at .3 or above are shown in bold.

[a]The natural log of this item was taken prior to the factor analysis.

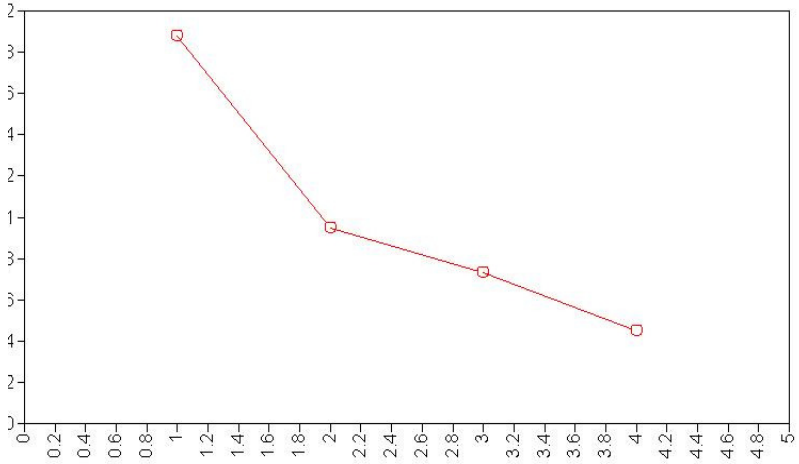
EFAs Run Separately by Factor

I next performed four separate EFAs on data for all participants in the exploratory sample—one EFA for each of the constructs with multiple indicators: Young Adulthood Occupational Rank, Young Adulthood Financial Resources, Financial Strain, and Perceived Control. Scree plots suggested a one-factor solution for Young Adulthood Occupational Rank, Young Adulthood Financial Resources, and Financial Strain; and a two-factor solution for Perceived Control (see Scree plots in Figure 4). Loadings of items onto extracted factors are shown in Table 14.

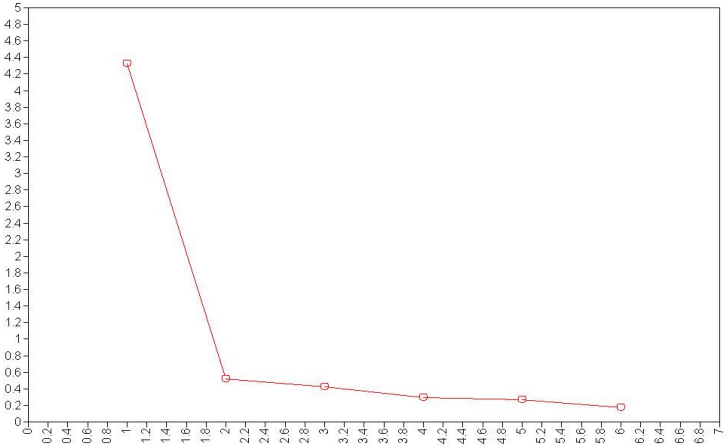
Figure 4. Scree Plots for Latent Factors Conducted in the Exploratory Sample



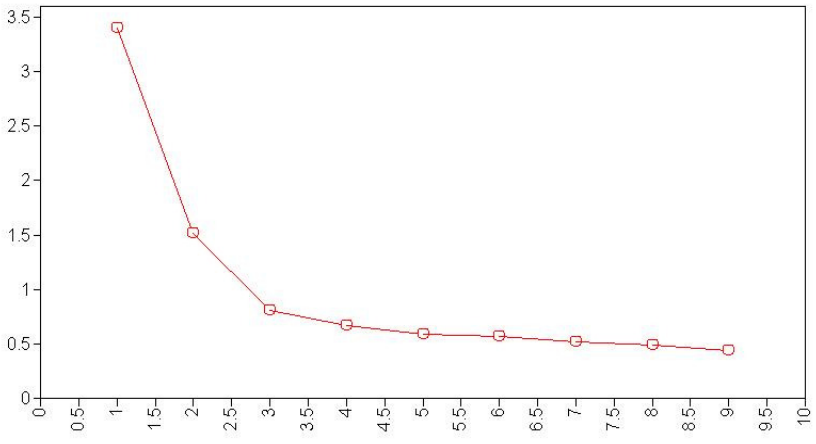
Young Adulthood Occupational Rank



Young Adulthood Financial Resources



Financial Strain



Perceived Control

Table 14

Loadings of Items According to Four Separate EFAs Conducted in the Exploratory Sample

Young Adulthood Occupational Rank		Young Adulthood Financial Resources	
Item	Load	Item	Load
Hours worked per week	**0.43**	Household income (12-pt scale)	**0.94**
Job provides health insurance	**0.98**	Personal earnings, dollars, thous [a]	**0.31**
Job provides retirement benefits	**0.94**	Own/in process of owning a home	**0.38**
Job provides paid vacation/sick time	**0.93**	Household assets (9-pt scale)	**0.56**
How physical is job	0.19		
Freedom to make decisions at work	0.19		
Repetitiveness of job (r)	0.23		
Level of supervisory role at job	0.16		
Job satisfaction	0.18		
Degree job fits with career goals	**0.41**		

Financial Strain		Perceived Control (all scored 1-5)		
Item	Load	Item	Load 1	Load 2
Without phone service	**0.83**	Unable to control things (r)	**0.73**	0.09
Didn't pay rent/mortgage	**0.84**	Confident in abil to handle problems	**0.49**	-0.11
Evicted from for not paying	**0.77**	Things are going your way	**0.58**	-0.09
Didn't pay full gas/electric/oil bill	**0.89**	Couldn't overcome difficulties (r)	**0.67**	0.00
Gas/electric turned off	**0.81**	Can do little to change things (r)	0.03	**0.66**
Worried food would run out	**0.78**	Others determine what can do (r)	-0.01	**0.65**
		Things interfere with wants (r)	-0.33	**0.32**
		Have little control over things (r)	-0.08	**0.67**
		No way to solve problems (r)	0.01	**0.74**

Note. Items to be retained according to the rule of loading at .3 or higher are shown in bold.

[a]The natural log of this item was taken prior to the factor analysis.

According to Stevens (2002), it is common to retain items that have an absolute loading of .30 or higher—with even higher loading cutoffs preferable when one's sample size is small, though small sample size is not a concern in this dissertation. According to Stevens, substantive meaning is also necessary when determining the meaning of factors. Table 14 shows that only one factor (Young Adulthood Occupational Rank) had items load at less than .3, after geomin rotation. To refine this factor and retain only those items

that loaded at .3 or higher, the lowest-loading item was dropped, and the EFA was rerun. This was done four times until all retained items loaded at .3 or higher. Items dropped were as follow: Level of Supervisory Role at Job (λ = .16 in the initial EFA), Freedom to Make Decisions at Work (λ = .18 in the first revised EFA), How Physical is Job (λ = .20 in the second revised EFA), Job Satisfaction (λ = 20 in the third revised EFA), and Repetitiveness of Job (λ = .19 in the fourth revised EFA; see Table 15). All revised Scree plots were similar to that shown for Young Adulthood Occupational Rank in Figure 4, only with a sharper elbow. The final version of the Young Adulthood Occupational Rank factor had a five items (Hours Worked per Week, Health Insurance, Retirement Benefits, Paid Vacation/Sick Time, and Fit with Career Goals), each of which loaded onto the factor positively at .30 or above.

Table 15

Refined EFAs of the Young Adulthood Occupational Rank Factor Conducted in the Exploratory Sample

Young Adulthood Occupational Rank: Original		Young Adulthood Occupational Rank: Revision 1	
Item	Load	Item	Load
Hours worked per week	**0.43**	Hours worked per week	**0.42**
Job provides health insurance	**0.98**	Job provides health insurance	**0.98**
Job provides retirement benefits	**0.94**	Job provides retirement benefits	**0.95**
Job provides paid vacation/sick time	**0.93**	Job provides paid vacation/sick time	**0.93**
How physical is job	0.19	How physical is job	0.19
Freedom to make decisions at work	0.19	Freedom to make decisions at work	0.18
Repetitiveness of job (r)	0.22	Repetitiveness of job (r)	0.22
Level of supervisory role at job	0.16		
Job satisfaction	0.23	Job satisfaction	0.22
Degree job fits with career goals	**0.41**	Degree job fits with career goals	**0.40**
Young Adulthood Occupational Rank: Revision 2		Young Adulthood Occupational Rank: Revision 3	
Item	Load	Item	Load 1
Hours worked per week	**0.42**	Hours worked per week	**0.43**
Job provides health insurance	**0.98**	Job provides health insurance	**0.98**
Job provides retirement benefits	**0.95**	Job provides retirement benefits	**0.95**
Job provides paid vacation/sick time	**0.93**	Job provides paid vacation/sick time	**0.93**
How physical is job	0.20		
Repetitiveness of job (r)	0.21	Repetitiveness of job (r)	0.20
Job satisfaction	0.20	Job satisfaction	0.20
Degree job fits with career goals	**0.39**	Degree job fits with career goals	**0.38**
Young Adulthood Occupational Rank: Revision 4		Young Adulthood Occupational Rank: Revision 5	
Item	Load	Item	Load
Hours worked per week	**0.43**	Hours worked per week	**0.43**
Job provides health insurance	**0.98**	Job provides health insurance	**0.98**
Job provides retirement benefits	**0.95**	Job provides retirement benefits	**0.95**
Job provides paid vacation/sick time	**0.93**	Job provides paid vacation/sick time	**0.93**
Repetitiveness of job (r)	0.19		
Degree job fits with career goals	**0.36**	Degree job fits with career goals	**0.34**

Note. Items to be dropped in the subsequent estimation of the EFA is shaded in grey.

Also note that the EFA run on Perceived Control items produced a two-factor solution, as seen in both the Scree plot (Figure 4) and the table of item loadings (Table 14). Additionally, fit indices indicated that a two-factor model fit the data more closely than a one-factor model: RMSEA = .119 for a one-factor model, RMSEA = .088 for a two-factor model. An examination of item loadings showed that items from the Social Psychology/Mental Health Add Health module loaded onto one Perceived Control factor, and items from the Personality Add Health module loaded onto a second Perceived Control factor. Social Psychology/Mental Health items (which loaded onto the first factor) measured feelings of control in the past 30 days, so this factor will be subsequently referred to as "Recent Perceived Control." In contrast, Personality items (which loaded onto the second factor) measured feelings of control "as you generally are," so this factor will be subsequently referred to as "Trait Perceived Control."

Construct reliability. Construct reliabilities were calculated using the formula provided by Hancock and Mueller (2001), for use in latent variable systems:

$$H = \frac{1}{1 + \frac{1}{(\lambda_1^2/(1-\lambda_1^2) + \ldots + (\lambda_p^2/(1-\lambda_p^2)}}$$

where λ refers to the loading of each item onto the factor. Higher H values signify better construct reliability, with the recommended cutoff for "good" reliability being between .70 and .80. In applying this formula to obtain the construct reliability for each of this dissertation's latent factors, I obtained the following results. Note that all construct reliabilities were .74 or higher, marking good reliability.

Young Adulthood Occupational Rank:

$$H = \frac{1}{1 + \frac{1}{(.43^2/(1-.43^2) + (.98^2/(1-.98^2) + (.95^2/(1-.95^2) + (.93^2/(1-.93^2) + (.34^2/(1-.34^2)}}$$

$$= .98$$

Young Adulthood Financial Resources:

$$H = \frac{1}{1 + \frac{1}{(.94^2/(1-.94^2) + (.31^2/(1-.31^2) + (.38^2/(1-.38^2) + (.56^2/(1-.56^2)}}$$

$$= .89$$

Financial Strain

$$H = \frac{1}{1 + \frac{1}{(.83^2/(1-.83^2) + (.84^2/(1-.84^2) + (.77^2/(1-.77^2) + (.89^2/(1-.89^2) + (.81^2/(1-.81^2) + (.78^2/(1-.78^2)}}$$

$$= .93$$

Recent Perceived Control:

$$H = \frac{1}{1 + \frac{1}{(.73^2/(1-.73^2) + (.49^2/(1-.49^2) + (.58^2/(1-.58^2) + (.67^2/(1-.67^2)}}$$

$$= .74$$

Trait Perceived Control:

$$H = \frac{1}{1 + \frac{1}{(.66^2/(1 - .66^2) + (.65^2/(1 - .65^2) + (.32^2/(1 - .32^2) + (.67^2/(1 - .67^2) + (.74^2/(1 - .74^2)}}$$

$= .78$

SUMMARY OF ANALYSES FOR RESEARCH QUESTION 1

In summary, when an EFA was performed on scores on all items used to measure objective aspects of SES (occupational rank, educational attainment, and financial resources) and psychological variables related to SES (financial strain, perceived SES, and perceived control), the Scree Plot method produced a one-factor solution, and relying on Kaiser's rule produced a seven-factor solution. Neither of these solutions were clear in their theoretical meaning. Separate EFAs were then run for each hypothesized construct that had more that one indicator. The resulting measurement models for Occupation Rank, Financial Resources, Financial Strain, Recent Perceived Control, and Trait Perceived Control were each had four to six indicators. Note that the hypothesized Perceived Control construct was broken down into two underlying factors.

Research Question 2: Are the results of the EFAs from Research Question 1 replicable in CFAs run across all participants and in each separate social group? Is there support for measurement invariance of these constructs across social groups?

To answer Research Question 2, I performed confirmatory factor analyses (CFAs) in Mplus using the cross-validation sample—first for all participants combined, then separately by gender (2 groups), by race/ethnicity (3 groups), and by gender *and* race/ethnicity (6 groups). After establishing support from CFAs that the configuration found in EFAs held in the cross-validation sample, according to traditional fit indices (namely, CFI, TLI, RMSEA) for each social group, paths were constrained across groups to see if the data provided support for measurement invariance across groups. For factors with dichotomous indicators, this comparison in fit was done using the DIFFTEST command in Mplus. Briefly, traditional Chi-Square comparisons of fit between models (unconstrained vs. constrained) cannot be performed when using WLSMV estimation. Instead, the creators of Mplus suggest comparing the fit of nested models that have been estimated with WLSMV using the "DIFFTEST" command in lieu of traditional Chi-Square comparisons. The DIFFTEST command was employed throughout this dissertation for testing competing models for factors with dichotomous indicators (Muthén & Muthén, 2010). Summary tables for the results of all analyses for Research Question 2 are provided on pp. 162-166 at the end of this chapter.

Because χ^2 is highly sensitive to sample size when used as a measure of model fit (with large samples increasing the statistic), CFI, TLI, and RMSEA were used as alternative measures of model fit. In making assessments of model fit for CFAs, the following rules of thumb were used: CFI and TLI values greater than .95 indicate good fit, and values greater than .90 indicate adequate fit. RMSEA values less than .05 indicate good fit and values less than .08 indicate reasonable fit (Keith, 2006). When one or more

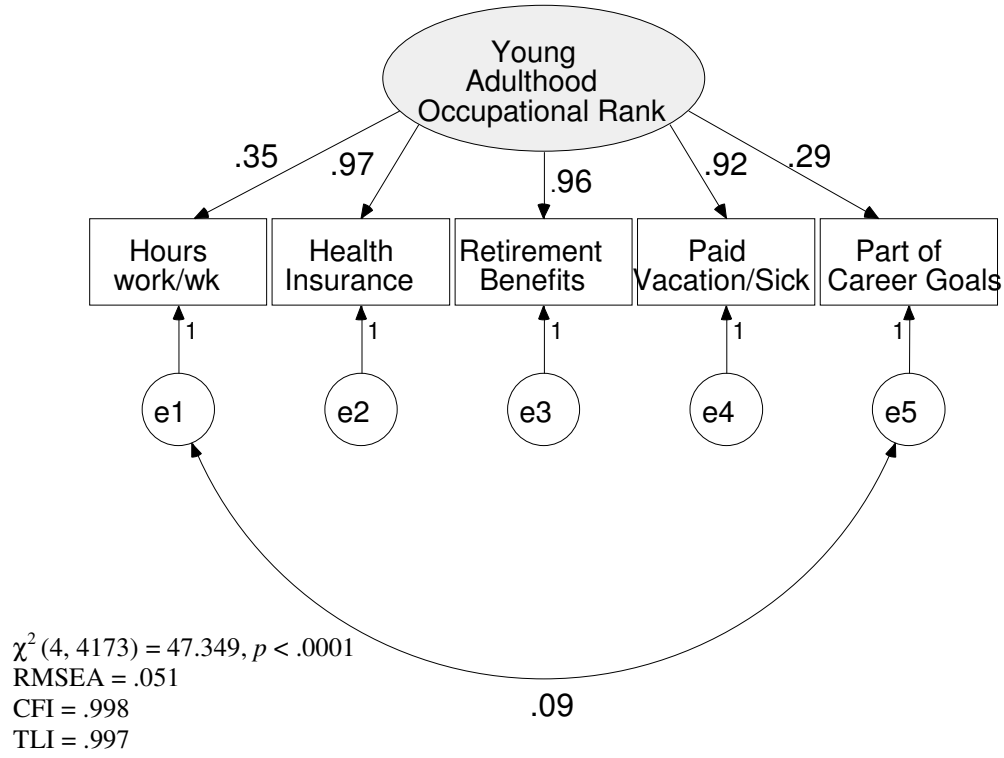
fit indices did not indicate good fit, Mplus-produced modification indices and standardized residuals were examined for statistical magnitude and theoretical meaning. Modifications were added when the Chi-Square improvement due to the modification was 3.84 or larger; when either the standardized (z-score) residual or residual correlation was larger than 1.96 or .02, respectively; and when the modification was sensible according to theory. With regard to residual matrices, Mplus produces both residual correlation and standardized z-score residual matrices when all indicators are continuous. When one or more indicators are dichotomous, however, Mplus *only* produces a residual correlation matrix. According to Muthén (2006) values in residual matrices are correlations, and not covariances, when outcomes are categorical, as with dichotomous indicators. No more than three model modifications were made for each social group to avoid overfitting of the model to the data (Keith, 2006).

Young Adulthood Occupational Rank, All Participants

The CFA for the Young Adulthood Occupational Rank factor showed that the initial model suggested by the EFA in Research Question 1 did *not* fit well according to all fit indices: $\chi^2(4, 4173) = 84.516$, $p < .0001$, CFI = .996, TLI = .995, RMSEA = .069. Note that while the CFI and TLI indices were above .95, indicating good fit of the model to the data, the RMSEA was above the < .05 cutoff for good fit. One modification (M1) was made to the model: an added correlation between errors for the Hours Worked and Goals items. This additional correlation was added because modification indices showed that this modification would result in a large and significant improvement in the fit of the model to the data. This modification brought the model to good fit according to all fit

indices, $\chi^2(4, 4173) = 47.349$, $p < .0001$, CFI = .998, TLI = .997, RMSEA = .051; and also significantly improved the Chi-square fit of the model to the data, according to results of the DIFFTEST, $\Delta\chi^2 (1, 4173) = 36.628$, $p < .0001$. This modified model (with M1) was used as the baseline model for all subsequent estimates of the model by gender, race/ethnicity, and social group. This baseline model with standardized loadings and correlations between errors, estimated across all participants, is shown in Figure 5. Note that the items that loaded most highly onto the Young Adulthood Occupational Rank construct were those related to job benefits (health insurance, retirement benefits, and paid vacation/sick time).

Figure 5. Young Adulthood Occupational Rank Factor with Modification 1, with Standardized Loadings, Estimated Across All Participants



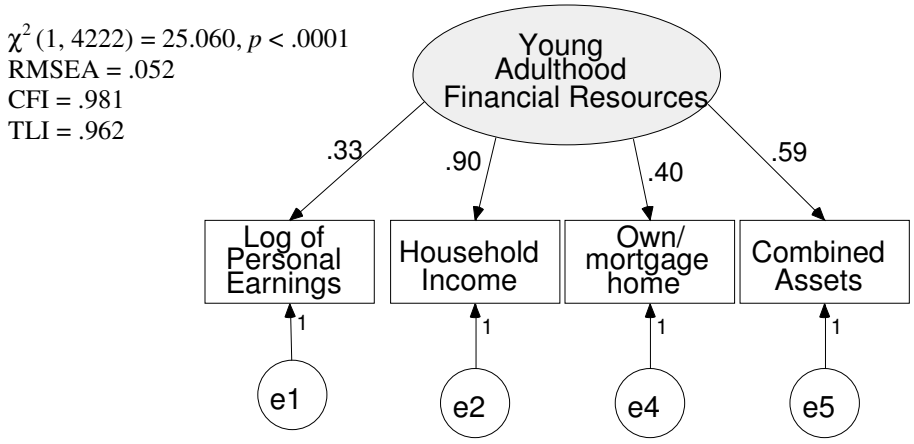
Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Young Adulthood Financial Resources, All Participants

The CFA for the Young Adulthood Financial Resources factor showed that the initial model suggested by the EFA in Research Question 1 fit well among all participants in the cross-validation sample: $\chi^2(2, 4222) = 25.060$, $p < .0001$, CFI = .981, TLI = .962, RMSEA = .052. This model served as the baseline model for all subsequent estimates of the model by gender, race/ethnicity, and social group. This baseline model with standardized loadings and correlations between errors, estimated across all participants, is

shown in Figure 6. Note that the strongest indicator of Young Adulthood Financial Resources across all participants was the Household Income item.

Figure 6. Young Adulthood Financial Resources Factor, with Standardized Loadings, Estimated Across All Participants

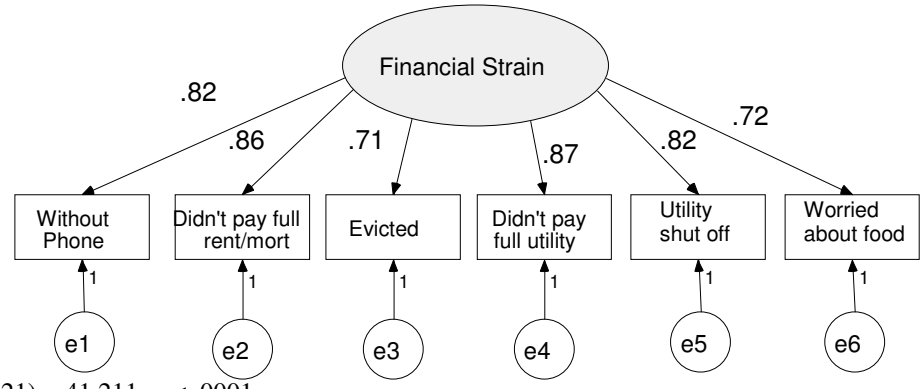


Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Young Adulthood Financial Strain, All Participants

The CFA for the Young Adulthood Financial Strain factor showed that the initial model suggested by the EFA in Research Question 1 fit very well among all participants in the cross-validation sample: $\chi^2(8, 4221) = 41.211$, $p < .0001$, CFI = .993, TLI = .992, RMSEA = .031. Thus, this model was used as the baseline model for all subsequent estimates of the model by gender, race/ethnicity, and social group. This baseline model with standardized loadings and correlations between errors, estimated across all participants, is shown in Figure 7. Note that all items loaded highly onto the Young Adulthood Financial Strain construct.

Figure 7. Young Adulthood Financial Strain Factor, with Standardized Loadings, Across All Participants



χ^2 (8, 4221) = 41.211, p < .0001
RMSEA = .031
CFI = .993
TLI = .992

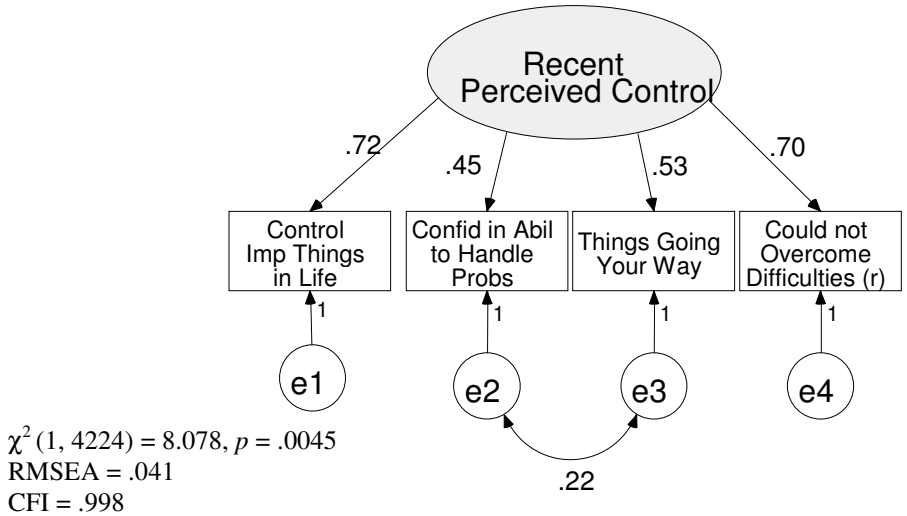
Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and p levels when using WLSMV estimation.

Young Adulthood Recent Perceived Control, All Participants

The CFA analysis of the initial measurement model for Recent Perceived Control suggested by the EFA in Research Question 1 did *not* have reasonable fit across all participants in the cross-validation sample: $\chi^2(2, 4224) = 159.857$, $p < .0001$, CFI = .949, TLI = .848, RMSEA = .137. Note that the TLI was below the .90 cutoff for adequate fit, and the RMSEA was above the .90 cutoff for reasonable fit. One modification (M1) was made to the model, an added correlation between errors for Confident in Ability to Handle Personal Problems and Things Going Your Way items. This additional correlation was added because modification indices showed that this modification would result in a large and significant improvement in the fit of the model to the data. This modification brought the model to good fit with the data according to all fit indices: $\chi^2(1, 4224) = 8.078$, $p = .0045$, CFI = .998, TLI = .968, RMSEA = .041; and also significantly

improved the Chi-Square fit of the model to the data, $\Delta\chi^2$ (1, 4224) = 151.779, $p < .0001$. This modified model (with M1) was used as the baseline model for all subsequent estimates of the model by gender, race/ethnicity, and social group. This baseline model with standardized loadings and correlations between errors, estimated across all participants, is shown in Figure 8.

Figure 8. Young Adulthood Recent Perceived Control Factor, with Standardized Loadings, Across All Participants



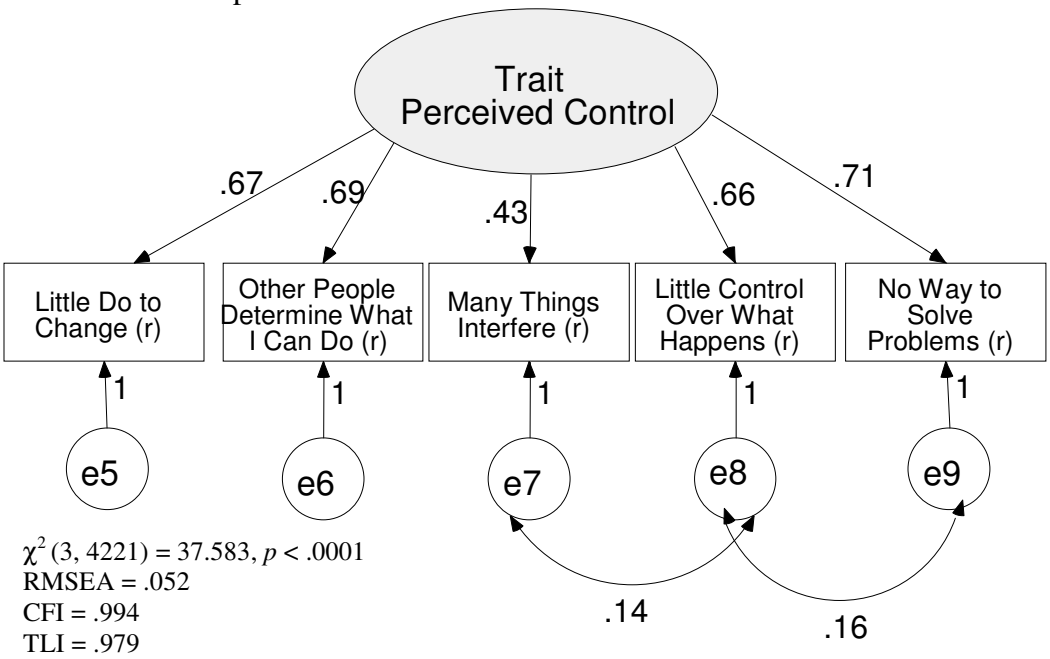
χ^2 (1, 4224) = 8.078, p = .0045
RMSEA = .041
CFI = .998
TLI = .968

Young Adulthood Trait Perceived Control, All Participants

The CFA for the Young Adulthood Trait Perceived Control factor showed that the initial model suggested by the EFA in Research Question 1 fit well among all participants in the cross-validation sample according to CFI and TLI fit indices (CFI = .980, TLI = .959), but only reasonably well according to the RMSEA (RMSEA = .073). Two modifications (M1 and M2) were made to the model, in succession. These were added correlations between errors for Many Things Interfere and Little Control items, and

between Little Control and No Way to Solve Problem items. These correlations were added because modification indices showed that each of these modifications would result in a large and significant improvement in fit of the model to the data. Each of these modifications also significantly improved the Chi-Square fit of the model to the data, $\Delta\chi^2$ (1, 4221) = 40.645, p <.0001 for M1, $\Delta\chi^2$ (1, 4221) = 37.825, p < .0001 for M2. The model with M1 and M2 fit well across all participants: χ^2(3, 4221) = 37.583, p < .0001, CFI = .994, TLI = .979, RMSEA = .052. This modified model (with M1 and M2) was used as the baseline model for all subsequent estimates of the model by gender, race/ethnicity, and social group. This baseline model with standardized loadings and correlations between errors, estimated across all participants, is shown in Figure 9.

Figure 9. Young Adulthood Trait Perceived Control Factor, with Standardized Loadings, Across All Participants



Young Adulthood Occupational Rank, by Subgroup

Young Adulthood Occupational Rank, by gender. Analyses for male and female subgroups showed that the baseline Occupational Rank model (with M1) fit reasonably for both men, $\chi^2(4, 1872) = 22.351$, $p = .0002$, CFI = .998, TLI = .998, RMSEA = .050; and women, $\chi^2(4, 2301) = 44.140$, $p < .0001$, CFI = .997, TLI = .996, RMSEA = .066. Mplus output did not suggest any statistically significant and theoretically meaningful additional modifications in the standardized residual matrix or list of potential Chi-square improvements for women, for whom the RMSEA was slightly larger (though still reasonable).

When the two-group model (by gender) for Occupational Rank was estimated allowing paths to be freely estimated in each group, the CFI, TLI, and RMSEA statistics suggested reasonable fit, $\chi^2(6, 4173) = 63.364$, $p < .0001$, CFI = .998, TLI = .995, RMSEA = .068. When paths were constrained to be equal across the gender subgroups, the TLI and RMSEA suggested unreasonable fit, $\chi^2(7, 4173) = 187.922$, $p < .0001$, CFI = .992, TLI = .998, RMSEA = .111. Additionally, DIFFTEST indicated a significant drop in model fit when paths were constrained, $\Delta\chi^2 (3, 4173) = 123.162$, $p < .0001$. As a whole, these findings suggested that there was not support for measurement invariance of the Occupational Rank construct across gender groups, and that it would be illogical to test for structural equivalence across gender among subsequent models involving the Occupational Rank construct.

Young Adulthood Occupational Rank, by race/ethnicity. The baseline Occupational Rank model (with M1) fit very well for Black participants, $\chi^2(4, 924) = 6.990$, $p = .1364$, CFI = .999, TLI = .999, RMSEA = .028; reasonably well for White participants, $\chi^2(4, 2512) = 40.687$, $p < .0001$, CFI = .997, TLI = .996, RMSEA = .060; and reasonably well for Latino participants, $\chi^2(4, 737) = 15.602$, $p = .0036$, CFI = .998, TLI = .997, RMSEA = .063. Mplus output did not suggest any statistically significant and theoretically meaningful additional modifications for White participants, but it did suggest that an added correlation between errors for Retirement and Goal items would improve fit of the model to the data for Latinos. This was seen in the in the large value for potential Chi-square improvement and a large standardized residual correlation associated with these correlated errors. This modification (M2) decreased the RMSEA for Latinos from .063 to .057, and resulted in a statistically significant improvement in fit of the model to the data, according to results of the DIFFTEST, $\Delta\chi^2 (1, 737) = 5.683$, $p = .0171$. Because of this difference in the configuration of the Occupational Rank model across racial/ethnic groups, tests of support of measurement invariance were not conducted (Horn & McArdle, 1992).

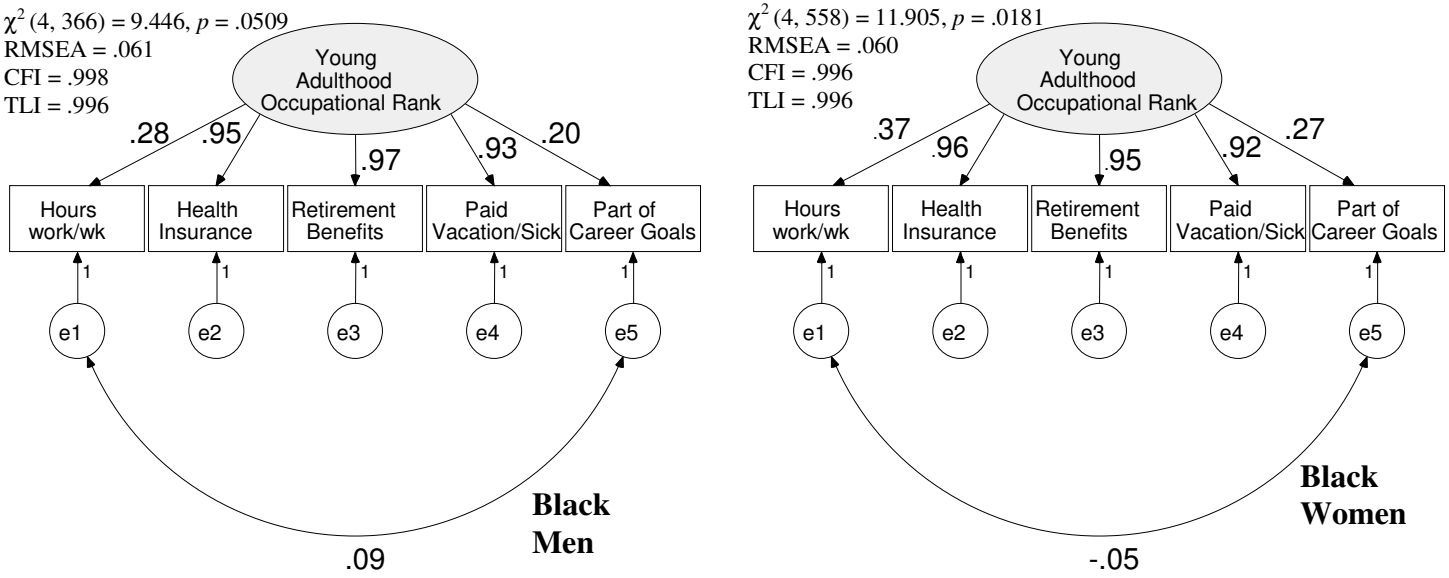
Young Adulthood Occupational Rank, by race/ethnicity and gender. When the baseline Occupational Rank model (with M1) was estimated among separate social groups (by gender *and* race/ethnicity), the Insurance indicator produced inadmissible solutions for Latino men. Setting this indicator's error variance to zero resulted in an inestimable model. Thus, the Insurance indicator was dropped from the construct for

Latino men. After dropping this item for Latino men only, estimation of the model for each social group revealed good to reasonable fit for all groups, with all CFIs and TLIs above .95, and all RMSEAs at .07 or lower. Coefficient *H* for the construct among Latino men was .95, calculated as follows:

$$H = \frac{1}{1 + \frac{1}{(.17^2/(1-.17^2) + (.97^2/(1-.97^2) + (.89^2/(1-.89^2) + (.30^2/(1-.30^2)}} = .95$$

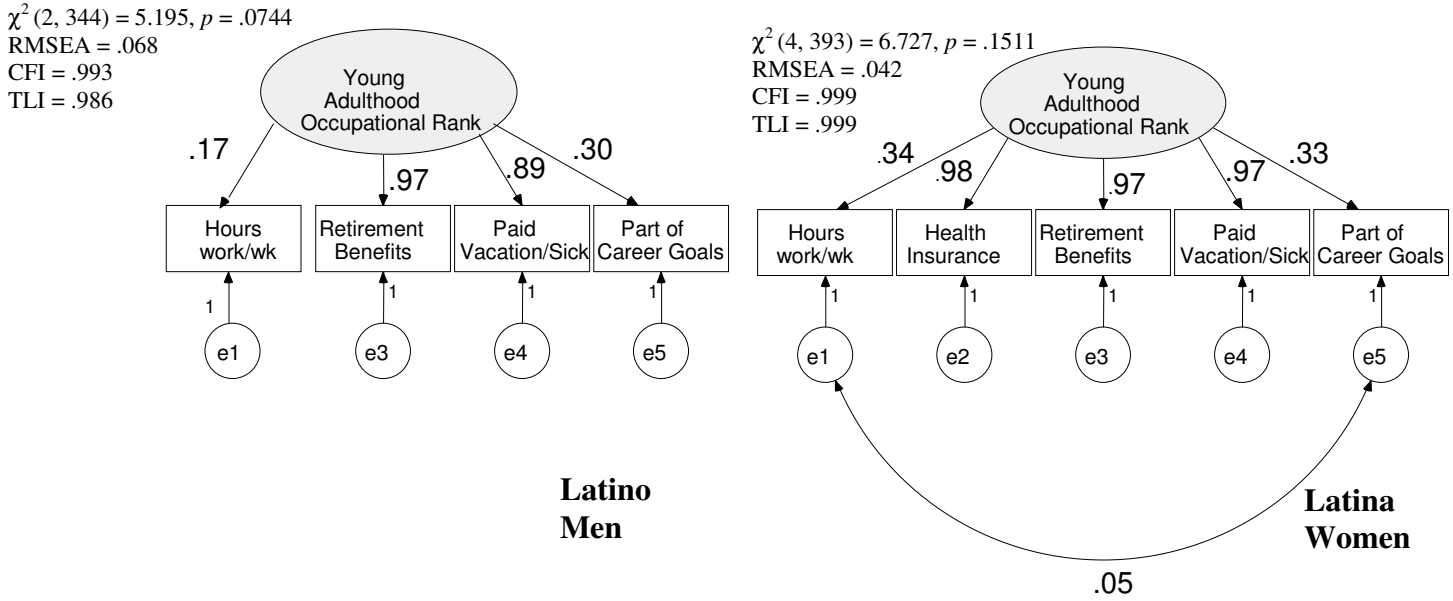
Because the configural model differed by social group, I did not test for support for measurement invariance by social group. Without evidence that the Occupational Rank construct means the same thing across social groups, it was illogical to formally test for structural equivalence across social groups among subsequent models involving the Occupational Rank construct. Standardized loadings of items onto the construct, correlations between errors, and model fit for each group are shown in Figures 10-12.

Figure 10. Configuration of Young Adulthood Occupational Rank Factor for Each Racial/Ethnic and Gender Subgroup



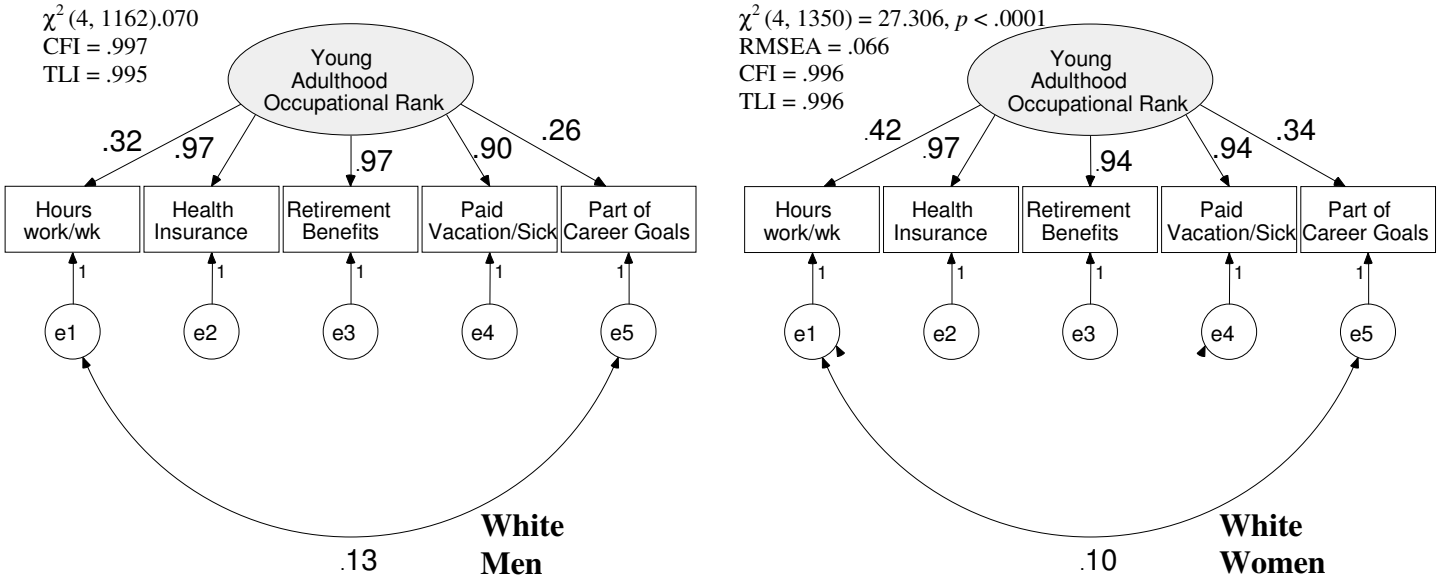
Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Figure 11. Configuration of Young Adulthood Occupational Rank Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Figure 12. Configuration of Young Adulthood Occupational Rank Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Summary of CFAs for Young Adulthood Occupational Rank by subgroup. There was not support for measurement invariance of the Occupational Rank construct across any social grouping (gender, race/ethnicity, or gender and race/ethnicity considered together). In estimating the fit of the Occupational Rank construct by race/ethnicity, configural differences emerged. Among Latinos, there was an association between Retirement and Goal items above and beyond what was accounted for by the Occupational Rank construct. Moreover, results suggested that health insurance is not a proper indicator of Occupational Rank for Latino men. Further examination of loadings of items by gender and racial/ethnic grouping also showed that the loading of the Goals item was slightly smaller for Black men, $\lambda = .20$. It is possible that whether a job fits into one's career goals is not a good indicator of Occupational rank for Black men, compared to the other indicators in the model. Because the meaning of the Occupational Rank construct differs by social group, this meant that it would be illogical to formally test for structural equivalence across social groups among models involving the Occupational Rank construct.

Young Adulthood Financial Resources, by Subgroup

Young Adulthood Financial Resources, by gender. CFAs estimating the fit of the baseline Financial Resources model separately among men and women showed that the model did not fit well for either gender, $\chi^2(2, 1890) = 42.354$, $p < .0001$, CFI = .957, TLI = .914, RMSEA = .103 for men; $\chi^2(2, 2331) = 29.851$, $p < .0001$, CFI = .953, TLI = .906, RMSEA = .077 for women. One modification, a correlation between errors for Household Income and Combined Assets items brought the model to reasonable fit to the

data for men, $\chi^2(1, 1890) = 9.408$, $p = .0022$, CFI = .991, TLI = .964, RMSEA = .067. This additional correlation was suggested by Mplus modification indices, seen in a large value for potential Chi-square improvement and a large standardized residual correlation associated with this correlation. This modification resulted in significantly better fit of the model to the data for men, according to results of the DIFFTEST, $\Delta\chi^2 (1, 1890) = 30.440$, $p < .0001$. Limited degrees of freedom prevented further modifications to the model for men to bring the RMSEA to < .05.

A different modification, an added correlation between errors for Personal Earnings and Household Income items, brought the model to good fit to the data for women, $\chi^2(1, 2332) = 2.431$, $p = .1190$, CFI = .998, TLI = .990, RMSEA = .025. This additional correlation was suggested by Mplus modification indices, seen in a large value for potential Chi-square improvement and a large standardized residual correlation associated with this correlation. This modification resulted in significantly better fit of the model to the data for women, according to results of the DIFFTEST, $\Delta\chi^2 (1, 2332) = 28.860$, $p < .0001$.

Because the configuration of the Financial Resources model differed between men and women, this precluded tests of support for measurement invariance across gender for this construct. Because the Financial Resources construct had a different meaning for men and women, this meant that it would be illogical to formally test for structural equivalence across gender among subsequent models involving the Financial Resources construct.

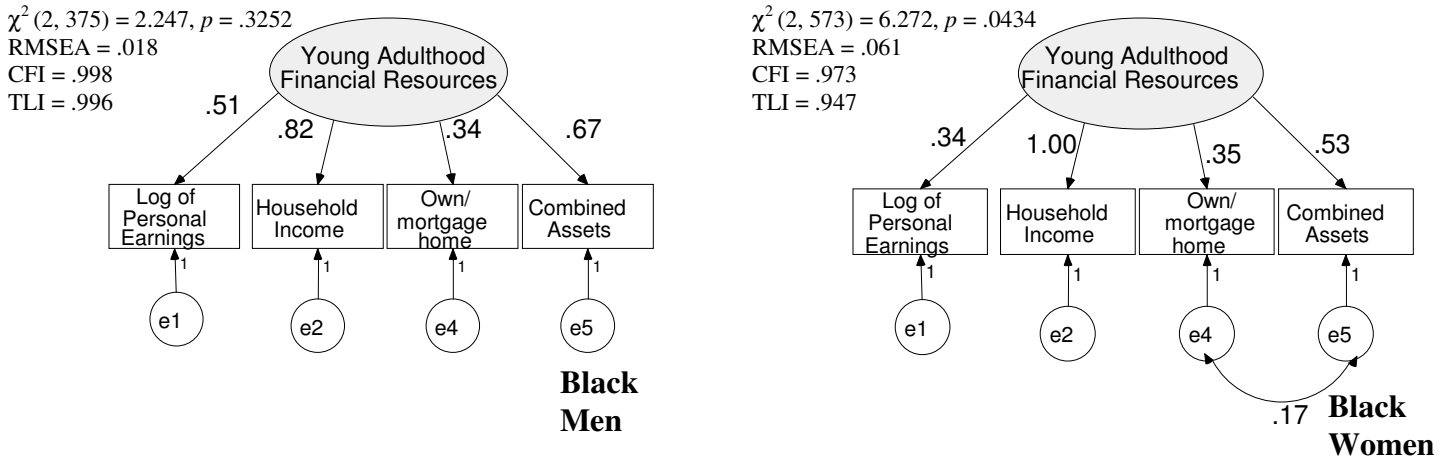
Young Adulthood Financial Resources, by race/ethnicity. CFAs of the baseline Financial Resources model run for each racial/ethnic group showed that the model fit well for Whites, $\chi^2(2, 2526) = 11.301$, $p = .0035$, CFI = .986, TLI = .972, RMSEA = .043, and Blacks, $\chi^2(2, 948) = 2.672$, $p = .2629$, CFI = .998, TLI = .995, RMSEA = .019. The model fit reasonably well for Latinos, $\chi^2(2, 748) = 8.928$, $p = .0115$, CFI = .963, TLI = .926, RMSEA = .068. No further model modifications were suggested by Mplus for Latinos.

A formal test of support for measurement invariance across race/ethnicity was performed using the DIFFTEST command. When the three-group model (by race/ethnicity) for Financial Resources was estimated allowing paths to be freely estimated in racial/ethnic each group, the CFI, TLI, and RMSEA statistics suggested good fit, $\chi^2(9, 4222) = 27.362$, $p = . .0012$, CFI = .984, TLI = .978, RMSEA = .038. When paths were constrained to be equal across the gender subgroups, the CFI, TLI, and RMSEA statistics suggested only reasonable fit, $\chi^2(13, 4222) = 96.600$, $p < .0001$, CFI = .925, TLI = .931, RMSEA = .068. The increase in Chi-square due to constraining paths to be equal across groups was significant according to results of the DIFFTEST, $\Delta\chi^2(6, 4222) = 78.478$, $p < .0001$, suggesting that there was *not* support for measurement invariance across race/ethnicity. Because the Financial Resources construct cannot be assumed to have the same meaning across racial/ethnic groups, this meant that it would be illogical to formally test for structural equivalence across race/ethnicity among subsequent models involving the Financial Resources construct.

Young Adulthood Financial Resources, by race/ethnicity and gender. Several different modifications were required to bring the baseline Financial Resources model to reasonable fit for separate social groups. Model fit for each tested model is shown in Table 17 at the end of this chapter. Specifically, correlated errors added to the model for various social groups were: Combined Assets with Household Income for White men, Own/Mortgage Home and Combined Assets for Latino men and Black women, and natural log of Personal Earnings with Household Income for Latina women. Note that small degrees of freedom prevented modifications to the model for White men. Note also that the error variance for the Household Income item was set to zero for Black women in order to achieve an estimable the model. No modifications to the baseline model were necessary for Black men and White women.

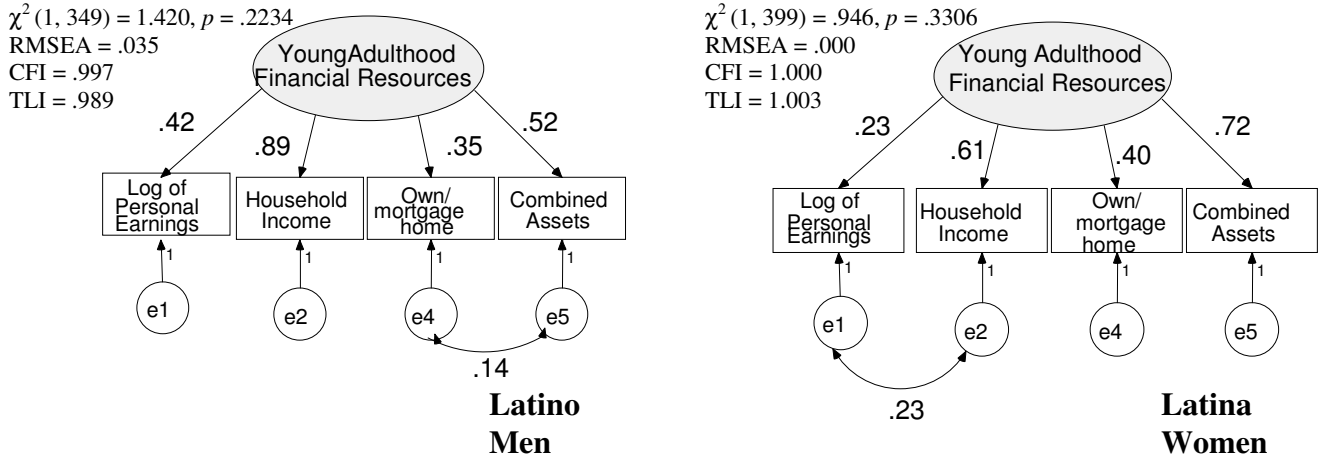
While an adequate model was thus achieved for all groups, differences in the configuration of the model precluded formal tests of support for measurement invariance across groups. Because meaning of the Financial Resources construct differs by social group, this meant that it would be illogical to formally test for structural equivalence across social groups among subsequent models involving the Financial Resources construct. Standardized loadings of items onto the construct, correlations between errors, and model fit for each group are shown in Figures 13-15.

Figure 13. Configuration of Young Adulthood Financial Resources Factor for Each Racial/Ethnic and Gender Subgroup



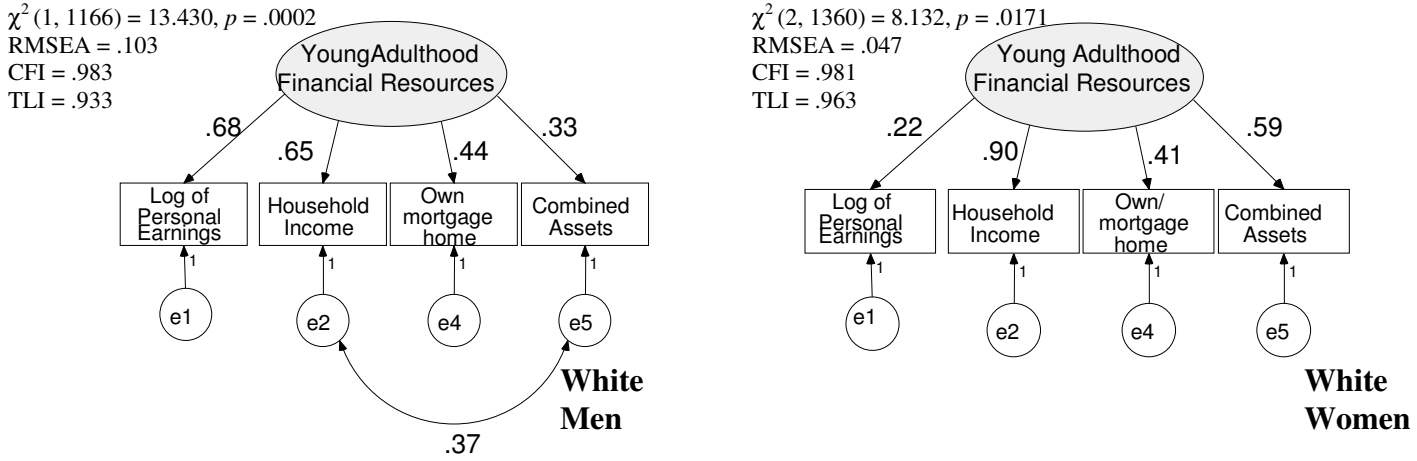
Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Figure 14. Configuration of Young Adulthood Financial Resources Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Figure 15. Configuration of Young Adulthood Financial Resources Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Summary of CFAs for Young Adulthood Financial Resources by subgroup. There was not support for measurement invariance of the Financial Resources construct across any social grouping (gender, race/ethnicity, or gender and race/ethnicity considered together). The construct was different in its structure across social groups in two important ways. First, different correlated errors brought the model to good fit for women compared to men. Specifically, the final model had a correlated error between log of Personal Earnings and Household Income for women, but between Combined Assets and Household Income for men. The correlated error among women suggests that there was a relationship between women's personal earnings and their household income above and beyond what was attributable to the Financial Resources construct. This correlation was particularly strong among Latina women, $r = .23$. One plausible explanation for this additional association between personal earnings and household income for women (but not men) is that higher-earning women may be more likely to married to higher-earning men. Unfortunately, it was impossible to test this hypothesis with the Add Health data because Add Health has not collected data on spouses.

Second, the loading of the Personal Earnings items was noticeably smaller for women (with the highest loading for any social group being $\lambda = .23$) than for men (with loadings ranging from $\lambda = .42$ to $\lambda = .68$). Unfortunately, since the configuration of the Income model differed for men and women (with different correlated errors for women vs. men), formal tests of the difference between the loading of the Personal Earnings into the construct cannot be conducted. However, a qualitative comparison of the loading of this item onto the construct for men versus women tells that Personal Earnings was not as

strong an indicator of Financial Resources for women as it was for men. The fact that loadings for Household Income and Combined Assets items were higher for women than for Personal Earnings implies that the young women in the current sample are *not* the primary breadwinners in their families. While Add Health does not contain couples data, men in the overall sample used in this dissertation earned $41,581 on average in the year prior to their Wave IV interview, while women earning only $27,902 on average during that year. An independent samples *t*-test using the Satterthwaite method of pooling variances, which differed significantly across gender, $p < .0001$, showed that this difference was statistically significant, $t(5675) = 14.17$, $p < .0001$. Because of these differences in the meaning of the Income construct by social group, this meant that it would be illogical to formally test for structural equivalence across social groups among subsequent models involving the Financial Resources construct

Young Adulthood Financial Strain, by Subgroup

Young Adulthood Financial Strain, by gender. The baseline Financial Strain model fit very well among both men, $\chi^2(8, 1888) = 16.708$, $p = .0333$, CFI = .994, TLI = .993, RMSEA = .024; and women, $\chi^2(7, 2333) = 27.339$, $p = .0003$, CFI = .993, TLI = .991, RMSEA = .035 for women. When the model was estimated across both genders for purposes of testing for measurement invariance, Mplus warned that standard errors could not be computed for this model. Formal tests of support for measurement invariance of the Financial Strain construct across gender would be ideal, but without support for measurement invariance of the Financial Strain construct across gender, there was not

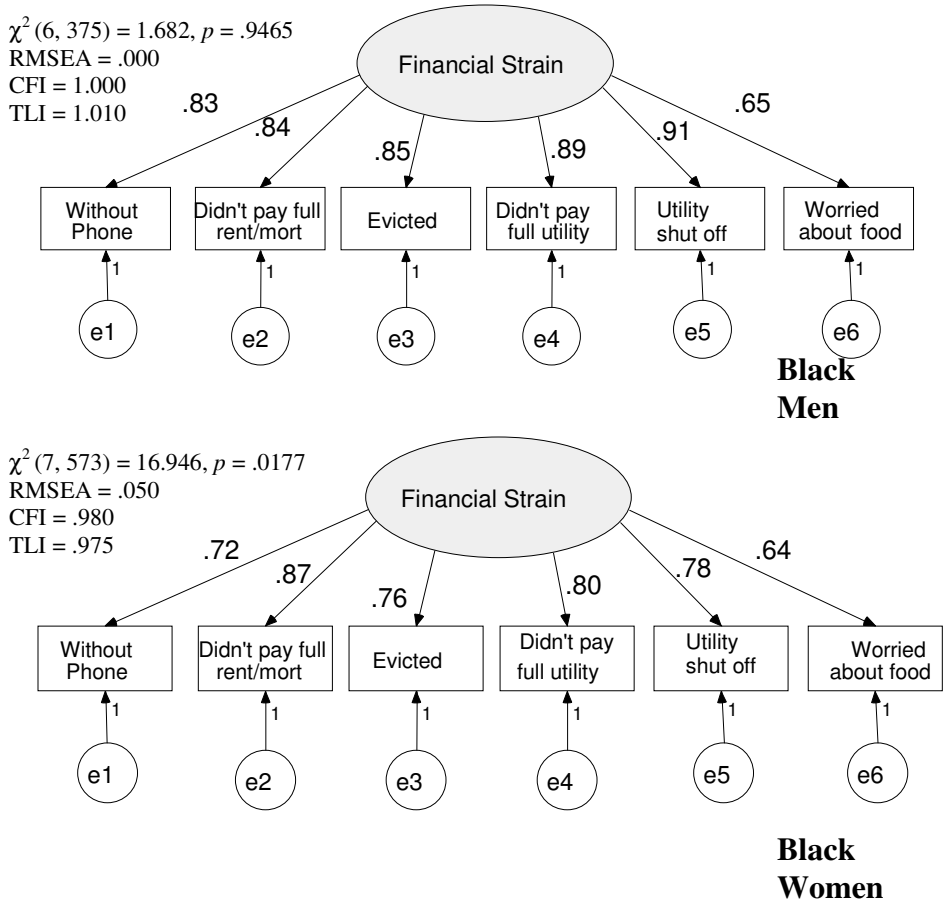
support for testing for structural equivalence across gender among subsequent models involving the Financial Strain construct.

Young Adulthood Financial Strain, by race/ethnicity. The baseline Financial Strain model also fit very well among each racial/ethnic group, $\chi^2(6, 2525) = 26.907$, $p = .0002$, CFI = .992, TLI = .989, RMSEA = .037 for Whites; $\chi^2(8, 948) = 10.849$, $p = .2104$, CFI = .998, TLI = .997, RMSEA = .019 for Blacks; $\chi^2(6, 748) = 6.942$, $p = .3263$, CFI = .999, TLI = .998, RMSEA = .014 for Latinos. As with gender, a model run across the three racial/ethnic groups with race/ethnicity as the grouping variable was inestimable, with standard errors unable to be computed. This precluded formal tests of support for measurement invariance across race/ethnicity, and there was not support for proceeding to test for structural equivalence across race/ethnicity among subsequent involving the Financial Strain construct.

Young Adulthood Financial Strain, by race/ethnicity and gender. The baseline Financial Strain model fit well for all subgroups. Standardized loadings of items onto the construct, correlations between errors, and model fit for each group are shown in Figures 16-18. As with tests of support for measurement invariance by gender and by race/ethnicity, a model run across social groups with social group as the grouping variable was unestimable. This precluded formal tests of support for measurement invariance by social group. Again, without evidence that the meaning of Financial Strain is the same across groups, there was not support for testing for structural equivalence

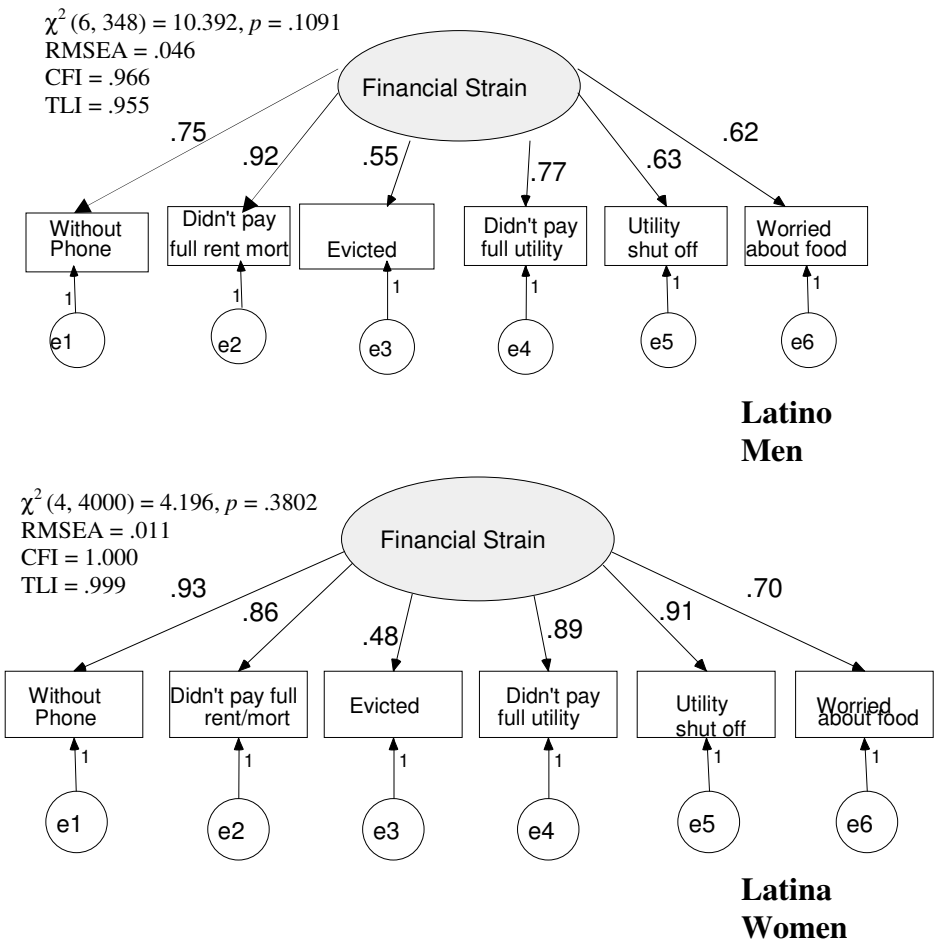
across social groups among subsequent models involving the Financial Strain construct analyses.

Figure 16. Configuration of Young Adulthood Financial Strain Factor for Each Racial/Ethnic and Gender Subgroup



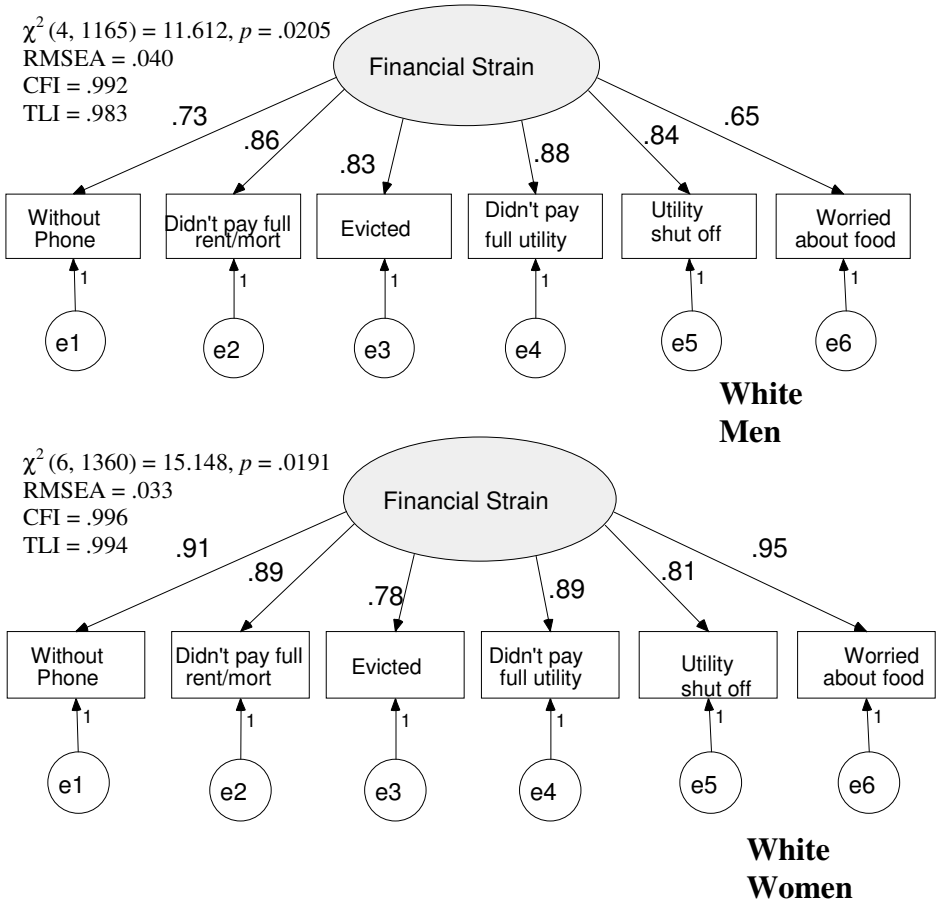
Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Figure 17. Configuration of Young Adulthood Financial Strain Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Figure 18. Configuration of Young Adulthood Financial Strain Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation.

Summary of CFAs for Young Adulthood Financial Strain by subgroup.

There was not support for measurement invariance of the Young Adulthood Financial Strain model across genders, across race/ethnicity, or across gender/race subgroups because multi-group models with these groups used as the grouping variables unestimable in Mplus. Without support for measurement invariance, it is illogical to tests for structural equivalence across social groups among subsequent models involving the Financial Strain construct. One way in which the measurement model differed across social groups is that the loading of the Evict item was noticeably lower for Latinos than for the other social groups, $\lambda = .55$ for Latino men and $\lambda = .48$ for Latina women, compared with loadings ranging from .76 to .85 for the other groups. This implies that being evicted from one's home because of inability to pay rent/mortgage payments is not as strong an indicator of Financial Strain among Latinos as it is for other groups.

Young Adulthood Recent Perceived Control, by Subgroup

Young Adulthood Recent Perceived Control, by gender. The baseline model fit well to the data for women, $\chi^2(1, 2333) = 1.044$, $p = .3070$, CFI = 1.000, TLI = 1.000, RMSEA = .004; and reasonably to the data for men, $\chi^2(1, 1891) = 8.765$, $p = .0031$, CFI = .993, TLI = .958, RMSEA = .064. With only one degree of freedom, it was not possible to make further modifications to the model among men, and a reasonably-fitting model was deemed sufficient.

When the two-group model (by gender) was estimated allowing paths to be freely estimated in each group, the CFI, TLI, and RMSEA statistics suggested good fit, $\chi^2(5,$

4224) = 33.393, $p < .0001$, CFI = .991, TLI = .978, RMSEA = .052. When paths were constrained to be equal across the gender groups, fit indices continued to indicate good fit, $\chi^2(8, 4224) = 39.668$, $p < .0001$, CFI = .990, TLI = .985, RMSEA = .043. Moreover, constraining item loadings to be equal across genders did not result in significantly poorer fit, $\Delta\chi^2$ (3, $N = 4224$) = 6.275, $p = 0.1000$. This tells that the constrained model, the more parsimonious of the two models, can be used for both groups, and that there *is* support for measurement invariance of the Recent Perceived Control construct across gender groups.

Young Adulthood Recent Control, by race/ethnicity. The baseline model also fit well for all racial/ethnic groups, $\chi^2(1, 2526) = 7.877$, $p = .0050$, CFI = .997, TLI = .980, RMSEA = .052 for Whites; $\chi^2(1, 948) = .100$, $p = .7514$, CFI = 1.000, TLI = 1.008, RMSEA = .000 for Blacks; $\chi^2(1, 750) = 2.252$, $p = .1335$, CFI = .997, TLI = .983, RMSEA = .041 for Latinos.

When the three-group model (by race/ethnicity) was estimated allowing paths to be freely estimated in each group, the CFI, TLI, and RMSEA statistics suggested good fit, $\chi^2(9, 4224) = 34.259$, $p = .0001$, CFI = .992, TLI = .984, RMSEA = .045. When paths were constrained to be equal across the racial/ethnic groups, fit indices continued to indicate good fit, $\chi^2(15, 4224) = 38.260$, $p = .0008$, CFI = .993, TLI = .991, RMSEA = .033. As with gender, change in Chi-square was nonsignificant when comparing the fit of a model with paths constrained to be equal across races/ethnicities to the fit of a model with paths freely estimated across race/ethnicities, $\Delta\chi^2$ (6, 4224) = 4.001, $p = 0.6765$.

This means that there is also support for measurement invariance of the Recent Perceived Control construct across racial/ethnic groups.

Young Adulthood Recent Perceived Control, by race/ethnicity and gender. Finally, the model with Modification 1 fit well for all racial/ethnic by gender groups (all CFIs and TLIs > .95; all RMSEAs at .05 or less), except for White men, for which there was adequate or reasonable fit according to fit statistics (CFI and TLI above .90; RMSEA at .08). With only one degree of freedom for the construct, and having achieved reasonable fit, additional model modification was not attempted. Table 20 shows fit statistics for each social group.

When the six-group model (by social group) was estimated allowing paths to be freely estimated in each group, the CFI, TLI, and RMSEA statistics suggested good fit, $\chi^2(21, 4224) = 68.054$, $p < .0001$, CFI = .985, TLI = .975, RMSEA = .056. When paths were constrained to be equal across the racial/ethnic groups, fit indices continued to indicate good fit, $\chi^2(36, 4224) = 95.218$, $p < .0001$, CFI = .981, TLI = .981, RMSEA = .048. However, the change in Chi-Square due to these constraints was significant, $\Delta\chi^2$ $(15, N = 4224) = 27.164$, $p = 0.0274$. The significance of this statistic indicated that there was *not* support for measurement invariance of the construct across social groups, and that it would be illogical to test for structural equivalence across social groups among subsequent models involving the Recent Perceived Control construct. Figures 19-21 show the configuration of the Recent Perceived Control construct, along with standardized loadings of items, correlations between errors, and model fit for each group.

Figure 19. Configuration of Young Adulthood Recent Perceived Control Factor for Each Racial/Ethnic and Gender Subgroup

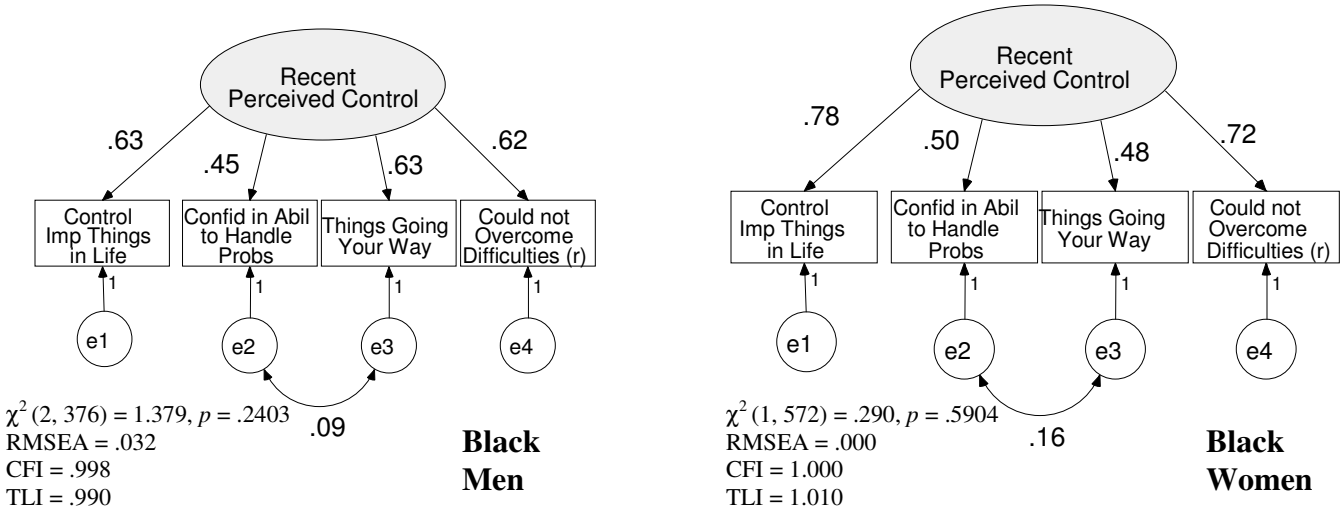
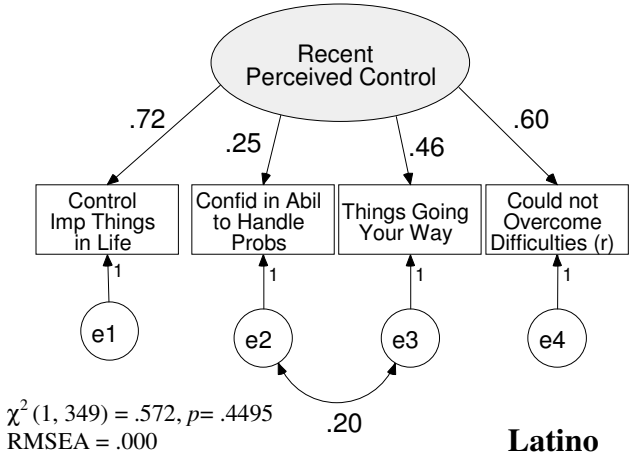
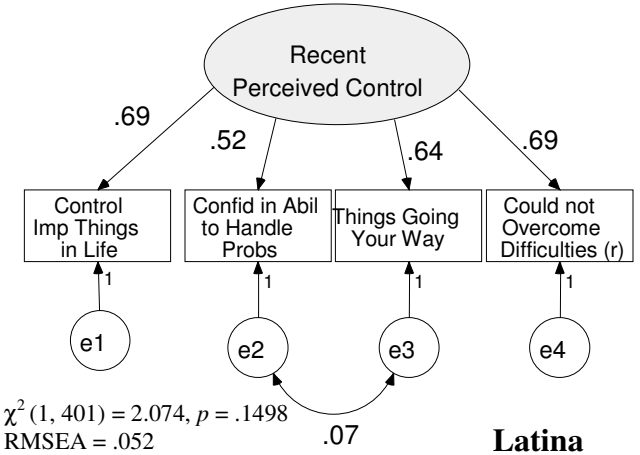


Figure 20. Configuration of Young Adulthood Recent Perceived Control Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



χ^2 (1, 349) = .572, p= .4495
RMSEA = .000
CFI = 1.000
TLI = 1.017

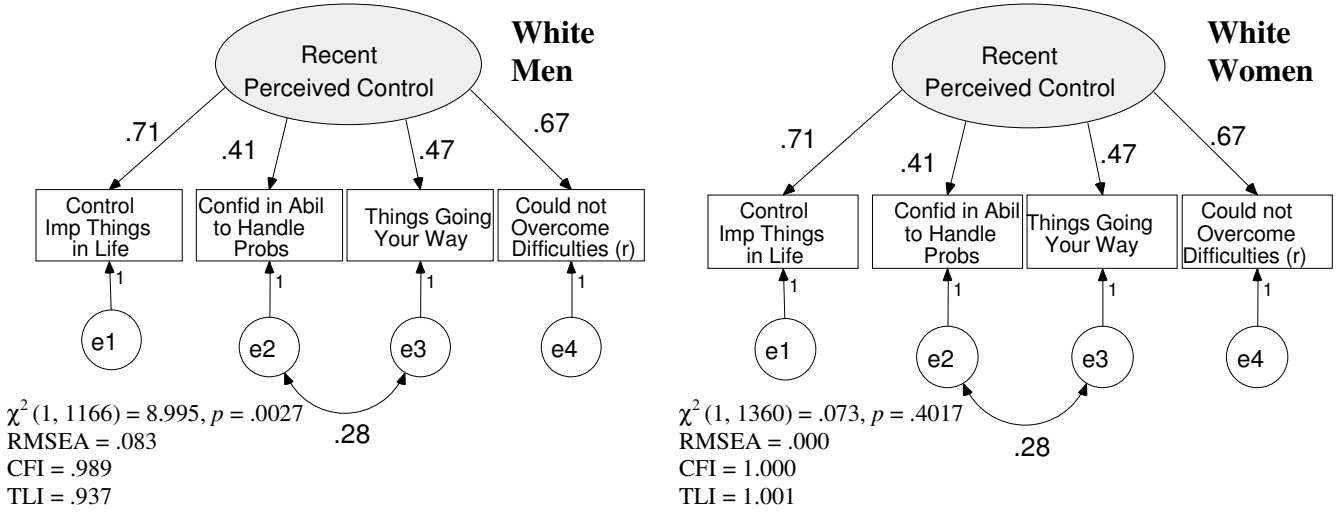
Latino Men



χ^2 (1, 401) = 2.074, p = .1498
RMSEA = .052
CFI = .997
TLI = .980

Latina Women

Figure 21. Configuration of Young Adulthood Recent Perceived Control Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



Summary of CFAs for Young Adulthood Recent Perceived Control by subgroup. There was support for measurement invariance of the Young Adulthood Perceived Recent Control construct across gender, and across race/ethnicity, but not in considering race and ethnicity jointly. One item, Confidence in Ability to Handle Problems, had a somewhat low loading among Latino men, $\lambda = .25$. This suggests that among Latino men, recent perceptions of control are indicated more strongly by scores on the other items—feeling in control of important things in life, things going one's way, and being able to overcome difficulties—than feeling able to handle problems.

Young Adulthood Trait Perceived Control, by Subgroup

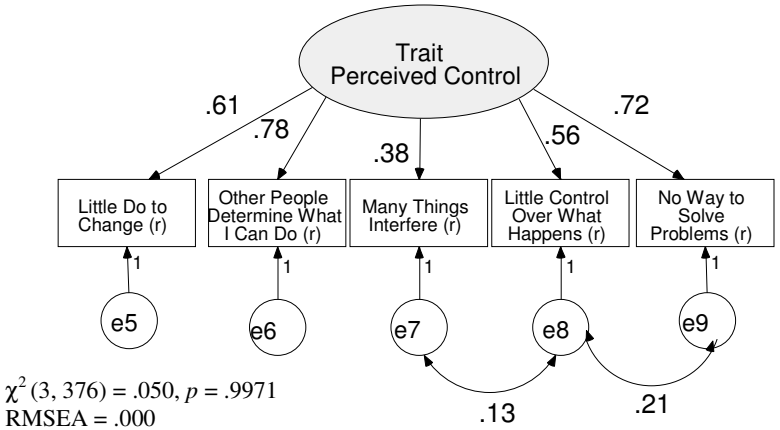
Young Adulthood Trait Perceived Control, by gender. The baseline Trait Perceived Control model (with M1 and M2) fit well for men, $\chi^2(3, 1890) = 14.588$, $p = .0220$, CFI = .995, TLI = .985, RMSEA = .045; and reasonably well for women, $\chi^2(3, 2331) = 24.856$, $p < .0001$, CFI = .993, TLI = .975, RMSEA = .056. One additional modification made to the model (M3), a correlation between errors for Other People Determine and Many Things Interfere items, brought the model to good fit with the data for women according to all fit indices, $\chi^2(2, 2331) = 10.561$, $p = .0051$, CFI = .997, TLI = .986, RMSEA = .043. This additional correlation was suggested by Mplus modification indices, seen in a large value for the potential Chi-square improvement and a large standardized z-score residual associated with this correlation. This modification resulted in significantly better fit of the model to the data for women, $\Delta\chi^2 (1, 2331) = 14.295$, $p < .0001$. Because the configural model differed between men and women, formal tests of

support for measurement invariance of the construct across gender groups could not be conducted. With no support for measurement invariance of the model across gender, structural models involving the Trait Perceived Control construct were not tested for structural equivalence across gender.

Young Adulthood Trait Control, by race/ethnicity. The baseline Trait Perceived Control model (with M1 and M2) fit well for Blacks, $\chi^2(3, 946) = 5.446$, $p = .0013$, CFI = .998, TLI = .994, RMSEA = .029; and Latinos, $\chi^2(3, 750) = 1.927$, $p = .5877$, CFI = 1.001, TLI = 1.004, RMSEA = .000. The baseline model fit reasonably well for Whites, $\chi^2(3, 2525) = 43.544$, $p < .0001$, CFI = .987, TLI = .958, RMSEA = .073. A third modification (a correlated error between Other People Determine and Many Things Interfere items; M3) brought the model to good fit with the data according to all indices for Whites, $\chi^2(2, 2525) = 12.677$, $p = .0018$, CFI = .997, TLI = .984, RMSEA = .046. This additional correlation had been suggested by Mplus modification indices, seen in a large value for the potential Chi-square improvement and a large standardized z-score residual associated with this correlation. Adding this correlation also resulted in significantly better fit of the model to the data for Whites, $\Delta\chi^2 (1, 2525) = 30.867$, $p < .0001$. Because the configuration of the model differed across racial/ethnic groups, this precluded tests of support for measurement invariance. Without support for measurement invariance of the construct across race/ethnicity, it was illogical to test for structural equivalence across race/ethnicity in of subsequent models involving the Trait Perceived Control construct.

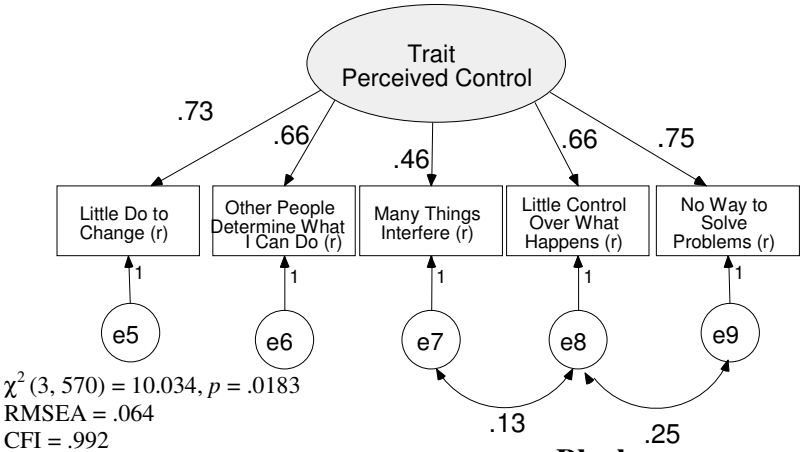
Young Adulthood Perceived Trait Control, by race/ethnicity and gender. The baseline Trait Perceived Control model (with M1 and M2) fit well for some social groups (Black men, Latino men, and Black women) but not others (White men, White women, and Latina women). Figures 22-24 show the configuration of the Trait Perceived Control construct, along with standardized loadings of items, correlations between errors, and model fit for each group. The previously mentioned M3 brought the model to good fit for White men and women; a different modification (a correlated error between Little Control and Other People Determine items; M4) brought the model to good fit for Latina women. This configural invariance of the Trait Perceived Control construct across the six social groups precluded tests of support for measurement invariance of the construct across social groups. Without support for measurement invariance of the construct across social groups, there was not support for conducting tests for structural invariance across social groups in subsequent models involving the Trait Perceived Control construct.

Figure 22. Configuration of Young Adulthood Trait Perceived Control Factor for Each Racial/Ethnic and Gender Subgroup



χ^2 (3, 376) = .050, p = .9971
RMSEA = .000
CFI = 1.000
TLI = 1.022

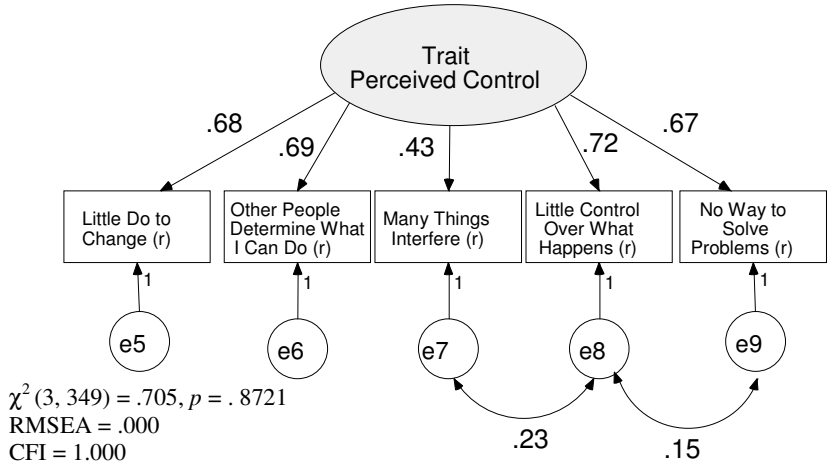
Black Men



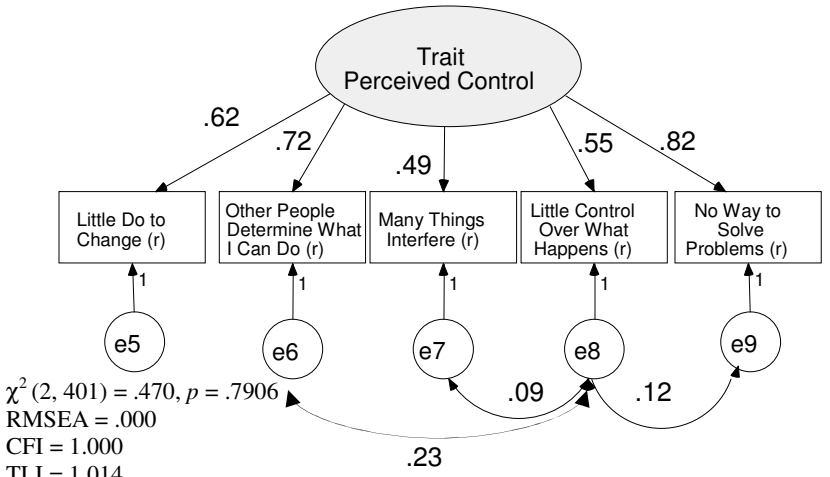
χ^2 (3, 570) = 10.034, p = .0183
RMSEA = .064
CFI = .992
TLI = .973

Black Women

Figure 23. Configuration of Young Adulthood Trait Perceived Control Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)

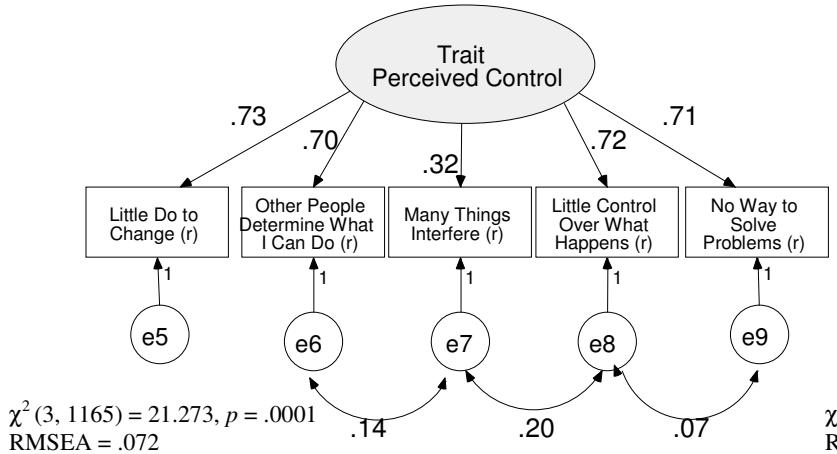


Latino Men



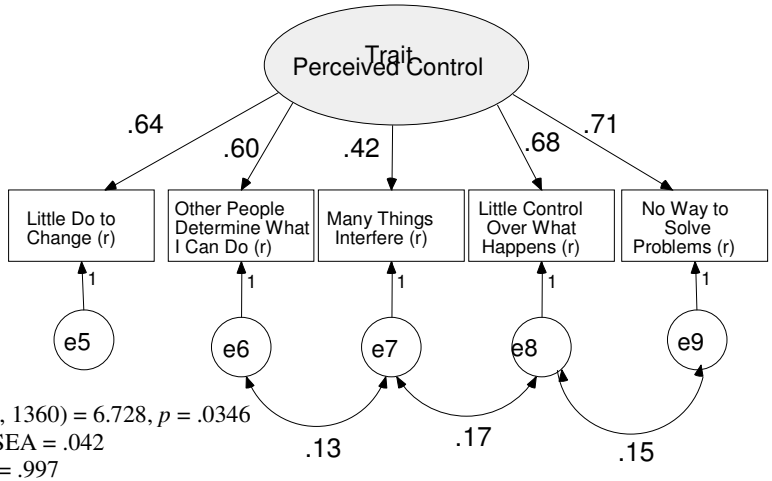
Latina Women

Figure 24. Configuration of Young Adulthood Trait Perceived Control Factor for Each Racial/Ethnic and Gender Subgroup (cont'd)



χ^2 (3, 1165) = 21.273, p = .0001
RMSEA = .072
CFI = .989
TLI = .963

White Men



χ^2 (2, 1360) = 6.728, p = .0346
RMSEA = .042
CFI = .997
TLI = .985

White Women

Summary of CFAs for Young Adulthood Trait Perceived Control by subgroup. Configuration of the Trait Perceived Control model differed by social group. Some social groups required a third correlated error to bring the model to good fit, and this correlated error differed by social group. Thus, although an adequate measurement model was constructed for all groups, there was not support for measurement invariance of the Trait Perceived Control construct across groups. This made it illogical to test for structural invariance across social groups in subsequent models involving the Trait Perceived Control construct.

SUMMARY OF ANALYSES FOR RESEARCH QUESTION 2

The measurement models suggested by the EFAs conducted for Research Question 1 fit well in the cross-validation sample with unique modifications made to the models for each social group. For most of the constructs, one to three modifications (correlated errors) were needed to bring the model to good fit to the data. There was not support for measurement invariance of any of the constructs across the six race/gender social groups assessed in this dissertation. This meant that I would not assess subsequent structural models for structural equivalence across social group. Tables 17-21 on the following pages summarize the analyses performed to address Research Question 2.

Also, as a follow-up to the construction of these measurement models, I explored basic correlations between the latent variables constructed for each group, shown in Table 16. Note that for all six social groups, Occupational Rank, Educational Attainment, and Financial Resources were significantly and positively correlated, as hypothesized. Note also that each of these traditional indicators of SES was also significantly and

positively correlated with Self-rated Health for all social groups, as hypothesized. Finally, note that for all social groups, an interesting finding emerged: a negative correlation between the Recent and Trait types of Perceived Control, shaded in grey. This negative correlation was not hypothesized, and was not part of the main Research Questions of this dissertation, and is thus not explored further here. Rather, it is discussed in the Discussion section.

Table 16

Pearson's *r* Intercorrelations among Aspects of SES, Psychological Variables, and Self-rated Health

Measure	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
				Black Americans (N = 376 for men, N = 573 for women)				
1. Occupation	-	0.25**	0.30***	-0.12	0.14	0.32**	-0.13	0.14
2. Education	0.31***	-	0.37***	-0.07	0.06	0.07	-0.28***	0.14*
3. Financial Resources	0.48***	0.54***	-	-0.43***	0.28***	0.47***	-0.32***	0.19*
4. Financial Strain	-0.06	-0.32***	-0.58***	-	-0.51***	-0.55***	0.23*	-0.26**
5. Perceived SES	0.17**	0.37***	0.41***	-0.34***	-	0.48***	-0.22**	0.19**
6. Recent Perceived Control	0.27***	0.21***	0.37***	-0.51***	0.38***	-	-0.59***	0.30***
7. Trait Perceived Control	-0.23**	-0.32***	-0.36***	0.07	-0.16**	-0.44***	-	-0.11
8. Self-rated Health	0.16*	0.27***	0.20**	-0.23***	0.23***	0.23***	-0.17**	-
				Latino/a Americans (N = 349 for men, N = 401 for women)				
1. Occupation	-	0.33***	0.43***	-0.53***	0.34***	0.26*	-0.26*	0.24*
2. Education	0.27***	-	0.27**	-0.37***	0.16**	0.24*	-0.40***	0.18*
3. Financial Resources	0.56***	0.34***	-	-0.47***	0.47***	0.36**	-0.26*	0.20*
4. Financial Strain	-0.36***	-0.36***	-0.73***	-	-0.30**	-0.64***	0.38***	-0.37***
5. Perceived SES	0.16	0.24***	0.31***	-0.50***	-	0.14	-0.31***	0.11
6. Recent Perceived Control	0.25**	0.24***	0.29**	-0.48***	0.36***	-	-0.50***	0.30**
7. Trait Perceived Control	-0.13	-0.37***	-0.32***	0.29**	-0.14*	-0.46***	-	-0.10
8. Self-rated Health	0.15	0.19**	0.20*	-0.23**	0.25***	0.32***	-0.18*	-
				White Americans(N = 1166 for men, N = 1360 for women)				
1. Occupation	-	0.22***	0.52***	-0.25***	0.21***	0.26***	-0.12**	0.12**
2. Education	0.33***	-	0.23***	-0.29***	0.36***	0.23***	-0.23***	0.21***
3. Financial Resources	0.46***	0.41***	-	-0.53***	0.45***	0.48***	-0.26***	0.23***
4. Financial Strain	-0.36***	-0.42***	-0.67***	-	-0.48***	-0.57***	0.28***	-0.26***
5. Perceived SES	0.30***	0.40***	0.52***	-0.44***	-	0.43***	-0.26***	0.25***
6. Recent Perceived Control	0.21***	0.23***	0.39***	-0.55***	0.43***	-	-0.63***	0.37***
7. Trait Perceived Control	-0.16***	-0.26***	-0.24***	0.32***	-0.34***	-0.59***	-	-0.25***
8. Self-rated Health	0.19***	0.29***	0.41***	-0.39***	0.34***	0.41***	-0.31***	-

Note. Pearson's *r* intercorrelations for men in each racial/ethnic group (*n*'s here) are presented above the diagonal, and Pearson's *r* intercorrelations for women in each racial/ethnic group (*n*'s here) are presented below the diagonal. Grey shading shows a negative correlation between Recent and Trait types of Perceived Control for all social groups.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 17

Comparisons of CFAs for Occupational Rank Construct for All Participants and Across Groups Conducted in the Confirmatory Sample

Model	*N*	χ^2	*df*	*p* for χ^2	$\Delta\chi^2$ for WLSMV	Δdf	*p* for $\Delta\chi^2$	CFI	TLI	RMSEA
All Participants (Prelim Model)	4173	84.516	4	< .0001				.996	.995	.069
All Participants (with M1)	4173	47.349	4	< .0001	36.628	1	< .0001	.998	.997	.051
By Gender										
All Men (with M1)	1872	22.351	4	.0002				.998	.998	.050
All Women (with M1)[a]	2301	44.140	4	< .0001				.997	.996	.066
Both Genders, Free (with M1)	4173	63.364	6	< .0001				.998	.995	.068
Both Genders, Constr (with M1)	4173	187.922	7	< .0001	123.162	3	< .0001	.992	.988	.111
By Race										
All Whites (with M1)[a]	2512	40.687	4	< .0001				.997	.996	.060
All Blacks (with M1)	924	6.990	4	.1364				.999	.999	.028
All Latinos (with M1)	737	15.602	4	.0036				.998	.997	.063
All Latinos (with M2)[a]	737	10.250	3	.0166	5.683	1	.0171	.999	.998	.057
All Races, Free	N/A due to racial/ethnic group differences in model									
All Races, Constr										
By Gender and Race										
White Men (with M1)[a]	1162	26.597	4	< .0001				.997	.995	.070
Black Men (with M1)	366	9.446	4	.0509				.998	.996	.061
Latino Men (without Insur)[b]	344	5.195	2	.0744				.993	.986	.068
White Women (with M1)[a]	1350	27.306	4	< .0001				.997	.996	.066
Black Women (with M1)[a]	558	11.905	4	.0181				.996	.996	.060
Latina Women (with M1)	393	6.727	4	.1511				.999	.999	.042
All Soc Grps, Free (with M1)	N/A due to social group differences in model									
All Soc Grps , Constr (with M1)										

Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation. For all models, Modification 1 (M1) is an added correlation between errors for Goal and Hours items, and Modification 2 (M2) is an added correlation between errors for Retirement and Goal items. The final model for each subgroup is boxed.

[a]No meaningful and sizable modifications were suggested by Mplus for this group; modifications ended with a reasonably-fitting model.

[b]One meaningful and sizable modification was suggested by Mplus for this group, but adding it resulted in an inadmissible model; modifications ended with a reasonably-fitting model.

Table 18

Comparisons of CFAs for Financial Resources Construct for All Participants and Across Groups Conducted in the Confirmatory Sample

Model	*N*	χ^2	*df*	*p* for χ^2	$\Delta\chi^2$ for WLSMV	Δdf	*p* for $\Delta\chi^2$	CFI	TLI	RMSEA
All Participants	4222	25.060	2	< .0001				.981	.962	.052
					By Gender					
All Men	1890	42.354	2	< .0001				.957	.914	.103
All Men (with M1)[a]	1890	9.408	1	.0022	30.440	1	< .0001	.991	.964	.067
All Women	2332	29.851	2	< .0001				.953	.906	.077
All Women (with M2)	2332	2.431	1	.1190	28.860	1	< .0001	.998	.990	.025
Both Genders, Free					N/A due to gender differences in model					
Both Genders, Constrain										
					By Race					
All Whites	2526	11.301	2	.0035				.986	.972	.043
All Blacks	948	2.672	2	.2629				.998	.995	.019
All Latinos[b]	748	8.928	2	.0115				.963	.926	.068
All Races, Free (with M2)	4222	27.362	9	.0012				.984	.978	.038
All Races, Constr (with M2)	4222	96.600	13	< .0001	78.478	6	< .0001	.925	.931	.068
					By Gender and Race					
White Men	1166	51.319	2	< .0001				.933	.867	.145
White Men (with M1)[a]	1166	13.430	1	.0002	35.750	1	< .0001	.983	.933	.103
Black Men	375	2.247	2	.3252				.998	.996	.018
Latino Men	349	4.365	2	.1128				.984	.968	.058
Latino Men (with M3)	349	1.420	1	.2234	2.895	1	.0889	.997	.989	.035
White Women	1360	8.132	2	.0171				.981	.963	.047
Black Women[c]	573	9.840	2	.0073				.951	.902	.083
Black Women[c,b] (with M3)	573	6.272	2	.0434				.973	.947	.061
Latina Women	399	6.517	2	.0384				944	.889	.075
Latina Women (with M2)	399	.946	1	.3306	5.621	1	.0178	1.000	1.003	.000
All Social Grps , Free					N/A due to social group differences in model					
All Social Grps, Constrain										

Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation. For all models, Modification 1 (M1) is an added correlation between errors for Household Income and Combined Assets items; Modification 2 (M2) is an added correlation between errors for Household Income and the natural log of Personal Income; and Modification 3 (M3) is an added correlation between errors for Own/Mortgage Home and Combined Assets items. The final model for each subgroup is boxed.

[a]Limited degrees of freedom prevented adding additional paths; modifications ended with a reasonably-fitting to good-fitting model.

[b]No further meaningful and sizable modifications were suggested by Mplus for this group; modifications ended with a reasonably-fitting to good-fitting model.

[c]Error variance for the Insurance indicator was set to zero for this group, in order for the model to run.

Table 19

Comparisons of CFAs for Financial Strain Construct for All Participants and Across Groups Conducted in the Confirmatory Sample

Model	*N*	χ^2	*df*	*p* for χ^2	$\Delta\chi^2$ for WLSMV	Δdf	*p* for $\Delta\chi^2$	CFI	TLI	RMSEA
All Participants	4221	41.211	8	< .0001				.993	.992	.031
					By Gender					
All Men	1888	16.708	8	.0333				.994	.993	.024
All Women	2333	27.339	7	.0003				.993	.991	.035
Both Genders, Free Both Genders, Constrained				Inestimable (standard errors could not be computed)						
					By Race					
All Whites	2525	26.907	6	.0002				.992	.989	.037
All Blacks	948	10.849	8	.2104				.998	.997	.019
All Latinos	748	6.942	6	.3263				.999	.998	.014
All Races, Free All Races, Constr				Inestimable (standard errors could not be computed)						
					By Gender and Race					
White Men	1165	11.612	4	.0205				.992	.983	.040
Black Men	375	1.682	6	.9465				1.000	1.010	.000
Latino Men	348	10.392	6	.1091				.966	.955	.046
White Women	1360	15.148	6	.0191				.996	.994	.033
Black Women	573	16.946	7	.0177				.980	.975	.050
Latina Women	400	4.196	4	.3802				1.000	.999	.011
All Social Grps, Free All Social Grps, Constrain				Inestimable (standard errors could not be computed)						

Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square and *p* levels when using WLSMV estimation. The final model for each subgroup is boxed.

Table 20

Comparisons of CFAs for Recent Perceived Control for All Participants and Across Groups Conducted in the Confirmatory Sample

Model	*N*	χ^2	*df*	*p* for χ^2	$\Delta\chi^2$	Δdf	*p* for $\Delta\chi^2$	CFI	TLI	RMSEA
All Participants	4224	159.857	2	< .0001				.949	.848	.137
All Participants (with M1)	4224	8.078	1	.0045	151.779	1	7.08e-35	.998	.968	.041
By Gender										
All Men (with M1)[a]	1891	8.765	1	.0031				.993	.958	.064
All Women (with M1)	2333	1.044	1	.3070				1.000	1.000	.004
Both Genders, Free (with M1)	4224	33.393	5	< .0001				.991	.978	.052
Both Genders, Constrained (with M1)	4224	39.668	8	< .0001	6.275	3	.1000	.990	.985	.043
By Race										
All Whites (with M1)	2526	7.877	1	.0050				.997	.980	.052
All Blacks (with M1)	948	.100	1	.7514				1.000	1.008	.000
All Latinos (with M1)	750	2.252	1	.1335				.997	.983	.041
All Races, Free (with M1)	4224	34.259	9	.0001				.992	.984	.045
All Races, Constrained (with M1)	4224	38.260	15	.0008	4.001	6	0.6765	.993	.991	.033
By Gender and Race										
White Men (with M1)[a]	1166	8.995	1	.0027				.989	.937	.083
Black Men (with M1)	376	1.379	1	.2403				.998	.990	.032
Latino Men (with M1)	349	.572	1	.4495				1.000	1.017	.000
White Women (with M1)	1360	.073	1	.4017				1.000	1.001	.000
Black Women (with M1)	572	.290	1	.5904				1.000	1.010	.000
Latina Women (with M1)	401	2.074	1	.1498				.997	.980	.052
All Social Grps, Free (with M1)	4224	68.054	21	< .0001				.985	.975	.056
All Social Grps, Constrained (with M1)	4224	95.218	36	< .0001	27.164	15	0.0274	.981	.981	.048

Note. For all models, Modification 1 (M1) is an added correlation between errors for Handle Personal Problems and Things Going Your Way items. The final model for each subgroup is boxed.

[a]Limited degrees of freedom prevented adding additional paths; modifications ended with a reasonably-fitting to good-fitting model.

Table 21

Comparisons of CFAs for Trait Perceived Control for All Participants and Across Groups Conducted in the Confirmatory Sample

Model	*N*	χ^2	*df*	*p* for χ^2	$\Delta\chi^2$	Δdf	*p* for $\Delta\chi^2$	CFI	TLI	RMSEA
All Participants	4221	116.053	5	< .0001				.980	.959	.073
All Participants (with M1)	4221	75.408	4	< .0001	40.645	1	1.83e-10	.987	.967	.065
All Participants (with M1 and M2)	4221	37.583	3	< .0001	37.825	1	7.74e-10	.994	.979	.052
					By Gender					
All Men (with M1 and M2)	1890	14.588	3	.0220				.995	.985	.045
All Women (with M1 and M2)	2331	24.856	3	< .0001				.993	.975	.056
All Women (with M1, M2, and M3)	2331	10.561	2	.0051	14.295	1	7.74-e08	.997	.986	.043
Both Genders, Free (with M1 and M2)					N/A due to gender differences in model					
Both Genders, Constr (with M1 and M2)										
					By Race					
All Whites (with M1 and M2)	2525	43.544	3	< .0001				.987	.958	.073
All Whites (with M1, M2, and M3)	2525	12.677	2	.0018	30.867	1	2.76e-08	.997	.984	.046
All Blacks (with M1 and M2)	946	5.446	3	.0013				.998	.994	.029
All Latinos (with M1 and M2)	750	1.927	3	.5877				1.0001	1.004	.000
All Races, Free					N/A due to race differences in model					
All Races, Constrain										
					By Gender and Race					
White Men (with M1 and M2)	1165	21.273	3	.0001				.989	.963	.072
White Men (with M1, M2, and M3)	1165	5.250	2	.0724	16.023	1	6.26e-05	.998	.990	.037
Black Men (with M1 and M2)	376	.050	3	.9971				1.000	1.022	.000
Latino Men (with M1 and M2)	349	.705	3	.8721				1.000	1.017	.000
White Women (with M1 and M2)	1360	21.387	3	.0001				.989	.962	.067
White Women (with M1, M2, and M3)	1360	6.728	2	.0346	14.659	1	.0001	.997	.985	.042
Black Women (with M1 and M2)[a]	570	10.034	3	.0183				.992	.972	.064
Latina Women (with M1 and M2)	401	7.346	3	.0617				.992	.973	.060
Latina Women (with M1, M2, and M4)	401	.470	2	.7906	.470	1	.0087	1.000	1.014	.000
All Social Grps, Free					N/A due to social group differences in model					
All Social Grps, Constr										

Note. Modifications are correlations between errors for the following items, with errors referring to those depicted in Figures 22-24: M1 = Many Things Interfere and Little Control (e7 with e8); M2 = Little Control and No Way to Solve Problems (e8 with e9); M3 = Other People Determine and Many Things Interfere (e6 with e7); M4 = Little Control and Other People Determine (e6 with e8). The final model for each subgroup is boxed.

[a]No meaningful and sizable modifications were suggested by Mplus for this group; modifications ended with a reasonably-fitting to good-fitting model.

Chapter 10: Results: Structural Models

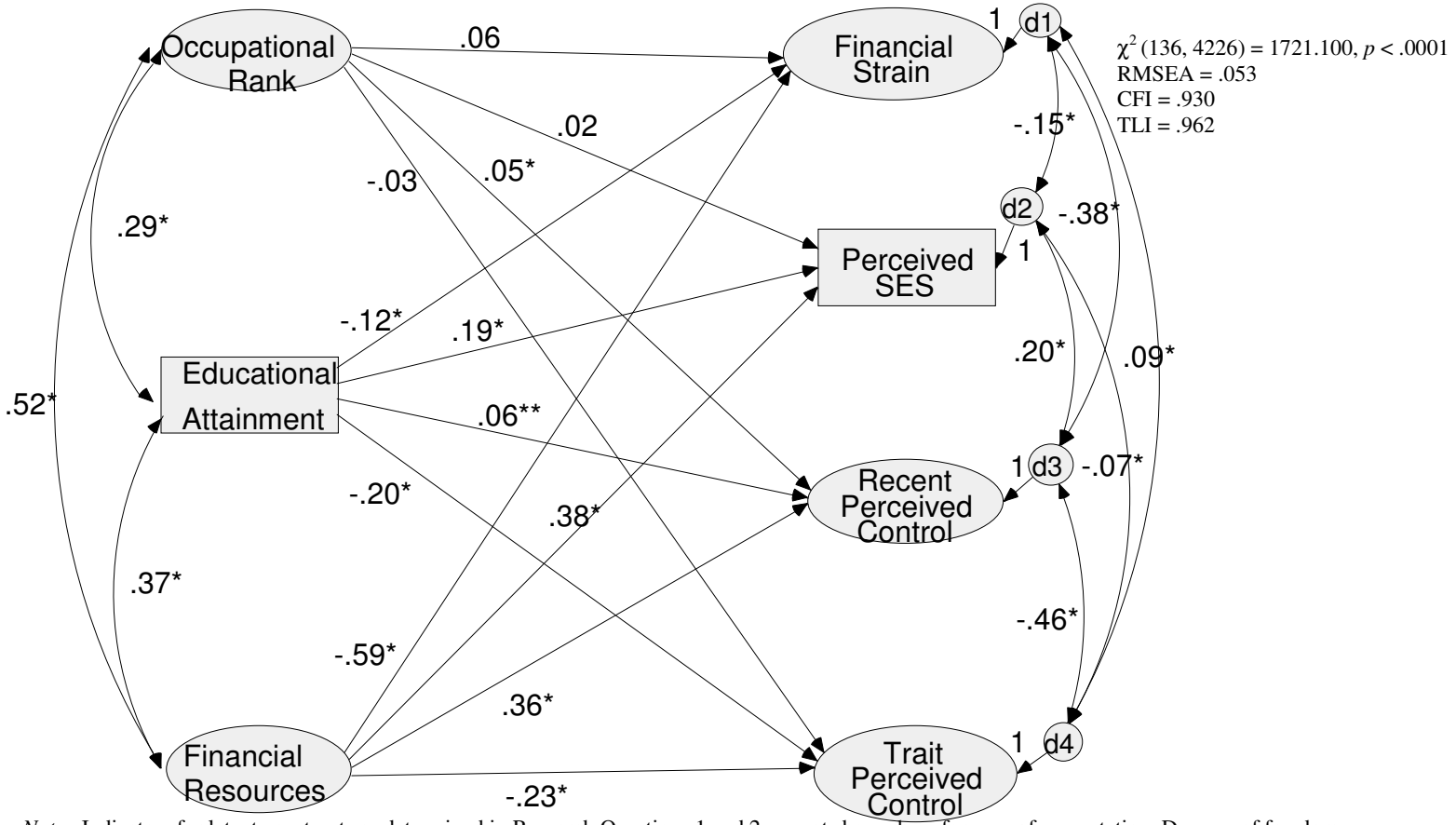
The following results pertain to the structural models that were estimated in order to answer Research Questions 3 and 4. First, I present paths and correlations among the aspects of SES and psychological variables named in this dissertation, estimating this model using the exploratory sample, across all participants. Then, I provide confirmatory support for this model by estimating it again in the cross-validation sample, and comparing the results of these models for similarity. Last, I present results for estimates of the structural model for each social group, and discuss the similarities and differences in the relationships among aspects of SES for these groups.

Research Question 3: What are the structural links of Young Adulthood Occupational Rank, Educational Attainment, and Financial Resources with each other, and with Financial Strain, Perceived SES, and Perceived Control, in the exploratory sample?

To answer Research Question 3, traditional aspects of SES and the psychological variables were linked in a structural model, and the model was estimated in Mplus using the exploratory sample. The model contains one additional construct than was originally proposed because the Perceived Control construct factored into two separate constructs: Recent Perceived Control and Trait Perceived Control. Overall, the baseline structural model fit reasonably well to the exploratory data according to CFI, TLI, and RMSEA fit indices, χ^2 (136, 4226) = 1721.100, $p < .0001$, CFI = .930, TLI = .962, RMSEA = .053.

Standardized results are shown in Figure 25. Unstandardized and Standardized results are displayed in Table 22. Note that figures denote which paths were significant at $p < .05$. Exact p levels are available in tables accompanying the figures.

Figure 25. Standardized Estimates for Structural Model Linking Variables/Constructs, Estimated Among All Participants in the Exploratory Sample



Note. Indicators for latent constructs as determined in Research Questions 1 and 2 are not shown here for ease of presentation. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and p levels when using WLSMV estimation. $^{*}p < .05$.
Exact p levels available in accompanying table.

Table 22

Unstandardized and Standardized Estimates for Structural Model Linking Aspects of SES and the Psychological Variables and Constructs in the Exploratory Sample Across All Participants

	Unstandardized Coefficient		Standardized Coefficient
	b	*SE*	b^*
Direct Effects			
Occ Rank on Strain	0.38	0.22	0.06
Educ Attain on Strain	-0.05***	0.01	-0.12***
Fin Resources on Strain	-0.45***	0.03	-0.59***
Occ Rank on Ladder	0.25	0.27	0.02
Educ Attain on Ladder	0.15***	0.01	0.19***
Fin Resources on Ladder	0.57***	0.04	0.38***
Occ Rank on Recent Cont	0.25*	0.13	0.05*
Educ Attain on Recent Cont	0.02**	0.01	0.06**
Fin Resources on Recent Cont	0.19***	0.02	0.36***
Occ Rank on Trait Cont	-0.10	0.09	-0.03
Educ Attain on Trait Cont	-0.04***	0.00	-0.20***
Fin Resources on Trait Cont	-0.09***	0.01	-0.23***
Covariances/Correlations			
Occ Rank with Educ Attain	0.08***	0.01	0.29***
Occ Rank with Fin Resources	0.08***	0.01	0.52***
Educ Attain with Fin Resources	0.94***	0.06	0.37***
Strain with Ladder	-0.16***	0.03	-0.15***
Strain with Recent Cont	-0.15***	0.01	-0.38***
Strain with Trait Cont	0.03**	0.01	0.09**
Ladder with Recent Cont	0.17***	0.02	0.20***
Ladder with Trait Cont	-0.05***	0.01	-0.07***
Rec Cont with Trait Cont	-0.11***	0.01	-0.46***
Model Fit			
χ^2 (136, 4226)		1721.100****	
RMSEA		0.053	
CFI		0.930	
TLI		0.962	

Note. $N = 4226$. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .0001$.

Traditional indicators of SES (occupational rank, educational attainment, and financial resources) were all positively and significantly correlated with each other, all *p*s < .001. Young Adulthood Financial Resources had the strongest effects in the model, as in the model estimated for Research Question 3. Financial Resources had a strong, negative impact on Financial Strain, standardized Beta, hereafter $b^* = -.59$, $p < .001$, which is intuitive. Young Adulthood Financial Resources also had the greatest impact on Perceived SES, measured by the MacArthur ladder, among the traditional SES indicators, $b^* = .38$, $p < .001$ for Financial Resources; compared with $b^* = .02$, $p = .36$ for Occupational Rank and $b^* = .19$, $p < .001$ for Educational Attainment. Likewise, participants garnered the greatest impact on Recent Perceived Control from Financial Resources, $b^* = .36$, $p < .001$, with Occupational Rank and Educational Attainment having relatively smaller effects on Recent Perceived Control, $b^* = .05$, $p < .05$ for Occupational Rank; $b^* = .06$, $p = .001$ for Educational Attainment.

Young Adulthood Educational Attainment also had a negative impact on Financial Strain, but the effect was much smaller than for Financial Resources, $b^* = -.12$, $p < .001$. Occupational Rank had no significant effect on Financial Strain, $b^* = .06$, $p = .09$. Interestingly, Occupational Rank, Educational Attainment and Financial Resources were all negatively associated with Trait Perceived Control, $b^* = -.03$, $p = .273$ for Occupational Rank; $b^* = -.20$, $p < .001$ for Educational Attainment; $b^* = -.23$, $p < .001$ for Income. This means that participants with lower levels of educational attainment and financial strain tended to have stronger traitlike feelings of perceived control. Note that

the direction of these associations is the opposite as seen for Recent Perceived Control, again highlighting a distinction between the Recent and Trait types of perceived control.

SUMMARY OF ANALYSES FOR RESEARCH QUESTION 3

The base model linking traditional aspects of SES and the psychological constructs fit reasonably well in the exploratory sample across all participants. Young Adulthood Financial Resources exhibited strong negative effects on Financial Strain and exhibited the strongest positive effects on Perceived SES and Recent Perceived Control. In contrast, participants with lower scores on Young Adulthood Financial Resources had higher scores on Trait Perceived Control. Lower scores on Educational Attainment were also associated with higher scores on Trait Perceived Control. In general, effects of Young Adulthood Occupational Rank and Young Adulthood Educational Attainment on the psychological variables were smaller than the effects of Young Adulthood Financial Resources.

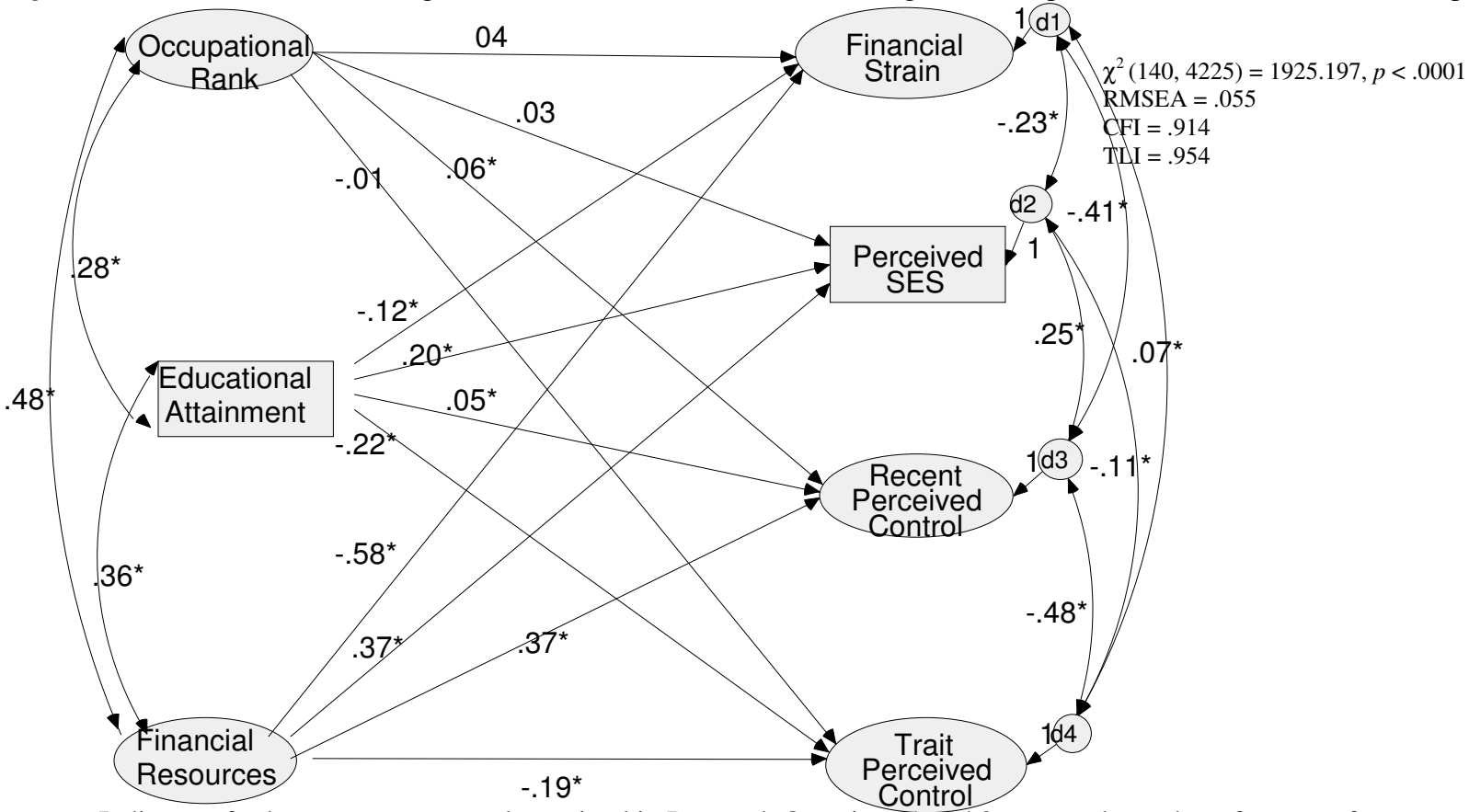
Research Question 4: Does the structural model found in exploratory analysis fit well in the cross-validation sample, across all participants and in each social group? Is there structural equivalence of the model across social groups?

To answer Research Question 4, the structural model analyzed for Research Question 3 was estimated in the cross-validation sample, first across all participants, then in each of the six gender/racial groups. Because I did not find support for measurement invariance of any of the constructs across social groups in Research Question 2, tests of support for structural equivalence of the model across social groups were not conducted

here. According to Keith (2006), it is illogical to test whether the effect of one construct on another is the same across groups, if the constructs themselves have different meanings for the different groups.

Structural model among all participants. The structural model linking traditional aspects of SES and the psychological variables, estimated across all participants in the cross-validation sample, fit similarly to the data as the model estimated in the exploratory sample. The fit of the model was adequate to good according to fit indices, and all fit indices were very similar to those for the model estimated in the exploratory sample, χ^2 (140, 4225) = 1925.197, $p < .0001$, CFI = .914, TLI = .954, RMSEA = .055. Path estimates for the cross-validation sample were similar in size, direction, and significance to those in the exploratory sample. Young Adulthood Financial Resources generally showed the largest effects among variables in the model, negatively impacting Financial Strain, positively affecting Subjective SES and Recent Perceived Control, and being negatively associated with Trait Perceived Control. As in the exploratory sample, those with lower levels of educational attainment and financial resources tended to be higher on Trait Perceived Control. Figure 26 shows the structural model, estimated among all participants in the cross-validation sample, along with standardized path estimates. Table 23 shows the standardized and unstandardized estimates for the model.

Figure 26. Structural Model Linking Variables/Constructs, Estimated Among All Participants in the Cross-Validation Sample



Note. Indicators for latent constructs as determined in Research Questions 1 and 2 are not shown here for ease of presentation. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation.

* $p < .05$. Exact *p* levels available in accompanying table.

Table 23

Unstandardized and Standardized Estimates for Structural Model Linking Aspects of SES and the Psychological Variables and Constructs in the Cross-validation Sample Across All Participants

	Unstandardized Coefficient		Standardized Coefficient
	b	*SE*	b^*
Direct Effects			
Occ Rank on Strain	0.27	0.25	0.04
Educ Attain on Strain	-0.05***	0.01	-0.12***
Fin Resources on Strain	-0.49***	0.04	-0.58***
Occ Rank on Ladder	0.37	0.30	0.03
Educ Attain on Ladder	0.16***	0.01	0.20***
Fin Resources on Ladder	0.61***	0.05	0.37***
Occ Rank on Recent Cont	0.36*	0.16	0.06*
Educ Attain on Recent Cont	0.01*	0.01	0.05*
Fin Resources on Recent Cont	0.24***	0.02	0.37***
Occ Rank on Trait Cont	-0.06	0.11	-0.01
Educ Attain on Trait Cont	-0.05***	0.00	-0.22***
Fin Resources on Trait Cont	-0.09***	0.01	-0.19***
Covariances/Correlations			
Occ Rank with Educ Attain	0.07***	0.01	0.28***
Occ Rank with Fin Resources	0.06***	0.01	0.48***
Educ Attain with Fin Resources	0.80***	0.06	0.36***
Strain with Ladder	-0.23***	0.03	-0.23***
Strain with Recent Cont	-0.17***	0.02	-0.41***
Strain with Trait Cont	0.02*	0.01	0.07*
Ladder with Recent Cont	0.22***	0.02	0.25***
Ladder with Trait Cont	-0.08***	0.01	-0.11***
Rec Cont with Trait Cont	-0.13***	0.01	-0.48***
Model Fit			
χ^2 (140, 4225)		1925.197****	
RMSEA		0.055	
CFI		0.914	
TLI		0.954	

Note. $N = 4225$. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .0001$.

Structural models for separate social groups. Next, the structural model was estimated separately in each gender/racial group, to assess whether the model fit similarly for members of different groups. Table 24 shows standardized path estimates for each of the gender/racial groups (six groups total), and Table 25 shows unstandardized path estimates. The structural model had reasonable fit for all groups (all CFIs and TLIs > .90, all RMSEAs < .07).

For all social groups, the strongest predictor of Financial Strain was Financial Resources, with lower amounts of Financial Resources associated with greater Financial Strain. The negative association between Financial Resources and Financial Strain was noticeably stronger for Latina women, $b^* = -.84$, $p < .001$, compared to Betas ranging from $b^* = -.29$ to $b^* = -.59$ for other social groups. Also, lower amounts of Educational Attainment were associated with greater Financial Strain for White men, White women, and Black women only. For Black men, Latino men, and Latina women, there was no significant association between Educational Attainment and Financial Strain.

Higher levels of Financial Resources were also associated with higher Perceived SES for all groups, all *p*s < .001. Higher levels of Educational Attainment were associated with higher levels of Perceived SES for some social groups but not others, though the direction of the effect was always positive. Higher levels of Financial Resources were significantly associated with higher levels of Recent Control for all groups. Educational Attainment contributed positively to Recent Control for White men and women only. This is contrary to findings by Bruce and Thornton (2004), who reported that African American adults in their sample garnered their sense control in life

not from income but from other sources, including education. As in the models estimated across all participants, those with lower levels of Educational Attainment and Financial Resources tended to have higher levels of Trait Control.

Table 24

Standardized Estimates for Structural Model Linking Aspects of SES and the Psychological Variables and Constructs in the Cross-validation Sample in Each Social Group

	*b** for Black Males (n = 376)	*b** for Latino Males (n = 349)	*b** for White Males (n = 1166)	*b** for Black Women (n = 573)	*b** for Latina Women (n = 401)	*b** for White Women (n = 1360)
Direct Effects						
Occ Rank on Strain	0.03	-0.23	-0.03	0.12	0.15	0.01
Educ Attain on Strain	-0.08	-0.04	-0.18***	-0.14*	0.00	-0.18***
Fin Resources on Strain	-0.38***	-0.29*	-0.48***	-0.49***	-0.84***	-0.59***
Occ Rank on Ladder	0.17*	0.19**	-0.05	0.02	0.00	0.05
Educ Attain on Ladder	0.08	0.12**	0.27***	0.22***	0.11	0.24***
Fin Resources on Ladder	0.30***	0.28***	0.42***	0.25***	0.35***	0.37***
Occ Rank on Recent Cont	0.24**	0.20*	0.04	0.16*	0.04	0.02
Educ Attain on Recent Cont	0.04	-0.04	0.11**	0.01	0.04	0.09**
Fin Resources on Recent Cont	0.24*	0.27**	0.45***	0.22**	0.33**	0.36***
Occ Rank on Trait Cont	-0.06	-0.02	0.01	-0.12	0.06	-0.02
Educ Attain on Trait Cont	-0.26***	-0.31***	-0.21***	-0.14*	-0.22***	-0.18***
Fin Resources on Trait Cont	-0.13	-0.11	-0.22***	-0.20**	-0.28*	-0.22***
Correlations						
Occ Rank with Educ Attain	0.26***	0.26***	0.24***	0.30***	0.25***	0.35***
Occ Rank with Fin Resources	0.45***	0.48***	0.46***	0.47***	0.62***	0.43***
Educ Attain with Fin Resources	0.40***	0.29***	0.25***	0.51***	0.42***	0.40***
Strain with Ladder	-0.30***	-0.28**	-0.21***	-0.21***	-0.33**	-0.23***
Strain with Recent Cont	-0.31***	-0.63***	-0.43***	-0.41***	-0.37***	-0.49***
Strain with Trait Cont	0.06	0.15	0.08	-0.07	0.03	0.21***
Ladder with Recent Cont	0.28***	0.08	0.26***	0.23***	0.25***	0.28***
Ladder with Trait Cont	-0.13*	-0.18**	-0.10**	-0.02	0.02	-0.20***
Rec Cont with Trait Cont	-0.49***	-0.27***	-0.56***	-0.39***	-0.38***	-0.57***
Model Fit						
df, N	75, 376	63, 349	75, 1166	91, 573	63, 401	101, 1360
χ^2	162.369	114.013	401.722	228.651	128.984	532.328
p for χ^2	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
RMSEA	0.056	0.048	0.061	0.051	0.051	0.056
CFI	0.932	0.909	0.935	0.930	0.966	0.927
TLI	0.951	0.925	0.943	0.952	0.970	0.959

Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .0001$.

Table 25

Unstandardized Estimates for Structural Model Linking Aspects of SES and the Psychological Variables and Constructs in the Cross-validation Sample in Each Social Group

	b (*SE*) for Black Males (*n* = 376)	*b* (*SE*) for Latino Males (*n* = 349)	*b* (*SE*) for White Males (*n* = 1166)	*b* (*SE*) for Black Women (*n* = 573)	*b* (*SE*) For Latina Women (*n* = 401)	*b* (*SE*) for White Women (*n* = 1360)
Direct Effects						
Occ Rank on Strain	0.20 (0.73)	-3.90 (2.53)	-0.23 (0.53)	0.82 (0.55)	1.59 (1.52)	0.05 (0.35)
Educ Attain on Strain	-0.03 (0.04)	-0.02 (0.04)	-0.07*** (0.02)	-0.05* (0.03)	0.00 (0.04)	-0.08*** (0.02)
Fin Resources on Strain	-0.24** (0.09)	-0.28* (0.12)	-0.50*** (0.07)	-0.37*** (0.08)	-0.80*** (0.23)	-0.48*** (0.07)
Occ Rank on Ladder	2.63* (1.11)	6.59* (3.08)	-0.76*** (0.59)	0.34 (0.78)	-0.04 (1.81)	0.58 (0.41)
Educ Attain on Ladder	0.06 (0.04)	0.09** (0.03)	0.21*** (0.02)	0.17*** (0.04)	0.09 (0.05)	0.19*** (0.02)
Fin Resources on Ladder	0.40*** (0.10)	0.56*** (0.14)	0.86*** (0.07)	0.39*** (0.11)	0.59** (0.22)	0.56*** (0.09)
Occ Rank on Recent Cont	1.39* (0.57)	2.60 (1.50)	0.23 (0.28)	0.90* (0.41)	0.31 (0.77)	0.08 (0.23)
Educ Attain on Recent Cont	0.01 (0.02)	-0.01 (0.02)	0.03** (0.01)	0.00 (0.02)	0.01 (0.02)	0.03** (0.01)
Fin Resources on Recent Cont	0.12* (0.05)	0.19* (0.08)	0.32*** (0.04)	0.14** (0.05)	0.23* (0.10)	0.22*** (0.04)
Occ Rank on Trait Cont	-0.27 (0.37)	-0.22 (0.96)	0.06 (0.22)	-0.54 (0.31)	0.28 (0.51)	-0.05 (0.13)
Educ Attain on Trait Cont	-0.06*** (0.02)	-0.08*** (0.02)	-0.05*** (0.01)	-0.03* (0.01)	-0.05** (0.02)	-0.03*** (0.01)
Fin Resources on Trait Cont	-0.05 (0.03)	-0.07 (0.05)	-0.13*** (0.03)	-0.11* (0.04)	-0.13* (0.06)	-0.08*** (0.02)
Covariances						
Occ Rank with Educ Attain	0.07*** (0.02)	0.02** (0.01)	0.05*** (0.01)	0.08*** (0.02)	0.05*** (0.01)	0.10*** (0.01)
Occ Rank with Fin Resources	0.07*** (0.02)	0.02** (0.01)	0.04*** (0.01)	0.06*** (0.01)	0.06*** (0.02)	0.07*** (0.01)
Educ Attain with Fin Resources	1.18*** (0.24)	0.48*** (0.11)	0.45*** (0.06)	1.24*** (0.19)	0.86*** (0.24)	0.96*** (0.14)
Strain with Ladder	-0.37*** (0.10)	-0.28** (0.10)	-0.22*** (0.06)	-0.24*** (0.07)	-0.31* (0.13)	-0.23*** (0.04)
Strain with Recent Cont	-0.15** (0.05)	-0.23*** (0.06)	-0.16*** (0.03)	-0.19*** (0.04)	-0.14** (0.05)	-0.21*** (0.03)

Table 25 (cont'd)

Strain with Trait Cont	0.02	0.05	0.03	-0.03	0.01	0.05***
	(0.04)	(0.04)	(0.02)	(0.03)	(0.03)	(0.01)
Ladder with Recent Cont	0.27***	0.06	0.19***	0.23***	0.24***	0.26***
	(0.07)	(0.06)	(0.03)	(0.05)	(0.07)	(0.03)
Ladder with Trait Cont	-0.10*	-0.12*	-0.07**	-0.02	0.01	-0.11***
	(0.05)	(0.05)	(0.02)	(0.04)	(0.04)	(0.02)
Rec Cont with Trait Cont	-0.15***	-0.07**	-0.13***	-0.14***	-0.10***	-0.13***
	(0.03)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
Model Fit						
df, N	75, 376	63, 349	75, 1166	91, 573	63, 401	101, 1360
χ^2	162.369	114.013	401.722	228.651	128.984	532.328
p for χ^2	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001
RMSEA	0.056	0.048	0.061	0.051	0.051	0.056
CFI	0.932	0.909	0.935	0.930	0.966	0.927
TLI	0.951	0.925	0.943	0.952	0.970	0.959

Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .0001$.

SUMMARY OF ANALYSES FOR RESEARCH QUESTION 4

Paths among variables and constructs in the structural model estimated in the cross-validation sample were similar in size and direction to those in the exploratory sample, with the strongest effects seen for Financial Resources. Financial Resources was negatively associated with Financial Strain and Trait Control, and positively associated with Perceived SES and Recent Control. Results were similar for each ethnic group with a few exceptions. Namely, the negative association between Financial Resources and Financial Strain was even stronger for Latina women; and Educational Attainment was associated with lower levels of Financial Strain and higher levels of Recent Control for Whites only.

Chapter 11: Results: Predictive Models

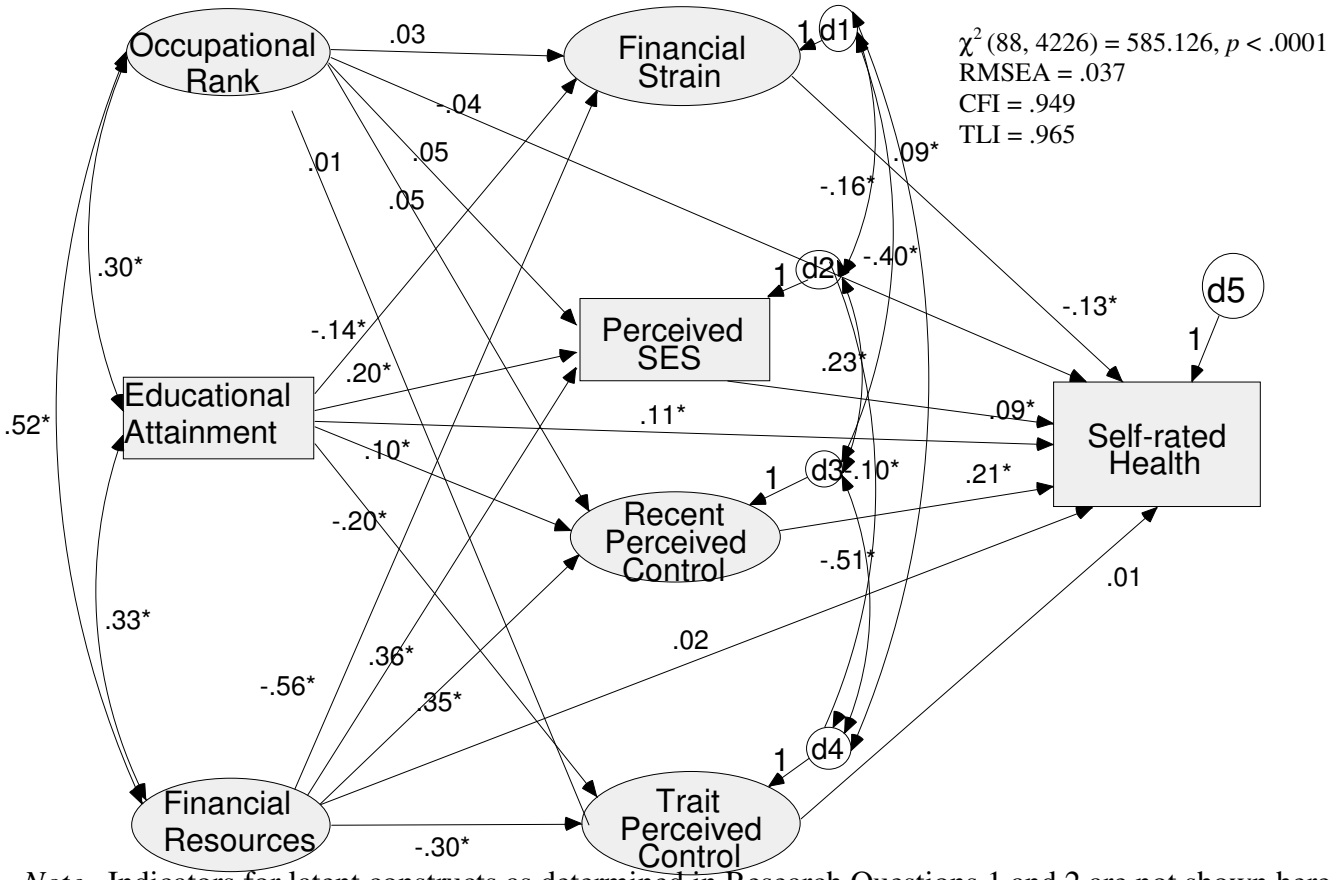
This last section of results pertains to the predictive models that were estimated to investigate the direct and indirect effects of aspects of SES on health. First, I present models estimating the direct effects of aspects of SES on each other and on self-rated health, across all participants, and in each separate social group. Then, I present evidence for certain indirect effects of objective aspects of SES (occupational rank, educational attainment, and financial resources) on self-rated health through psychological mediators for all participants and separately by social group. Last, I present results of analyses in which I account for potentially two confounding variables in the young adulthood SES-health relationship: IQ and Childhood SES.

Research Question 5: What is the direct effect of each traditional aspect of SES and each of the psychological variables on Self-rated Health? Are these effects equivalent across social groups?

To answer Research Question 5, the structural model predicting Self-rated Health was estimated first in the exploratory sample, then in the cross-validation sample, across all participants. Then, sampling weights were applied in order to make results nationally generalizable. Finally, the model was estimated separately for each of the six social groups in the cross-validation sample, with sampling weights applied. I did not conduct tests of support for structural equivalence of the model across social groups because I had not found support for measurement invariance of the constructs across social groups in analyses for Part I.

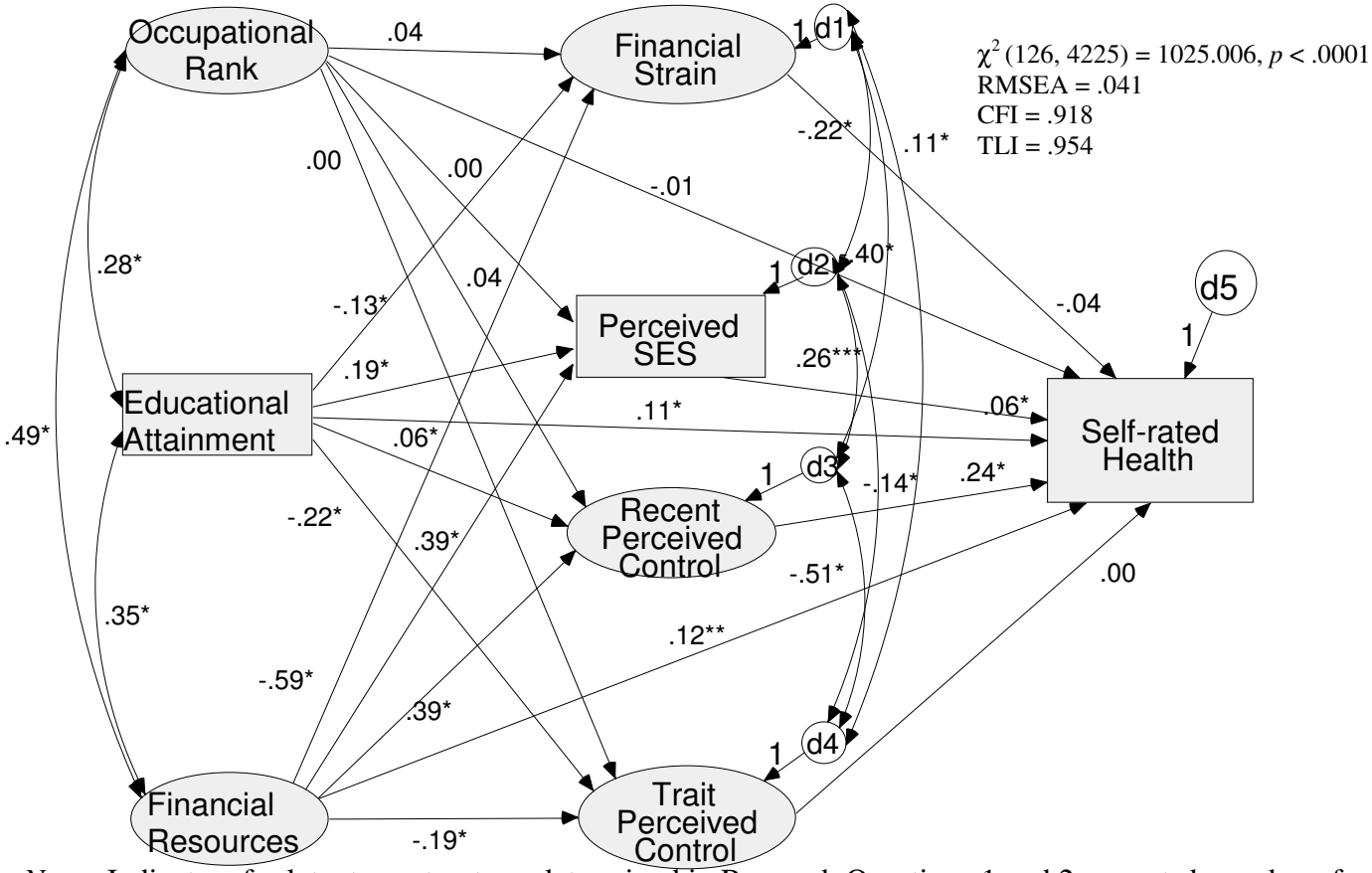
Predictive model among all participants. Relationships among variables and constructs for the predictive model were similar to the estimates found in the structural models estimated for Research Questions 3 and 4 (see Figures 27 and 28, and Tables 26 and 27). As in the structural models, Financial Resources had the strongest effects on Financial Strain, Perceived SES, and Recent Control; and lower levels of Educational Attainment and Financial Resources were associated with higher levels of Trait Control.

Figure 27. Weighted Standardized Path Coefficients for Structural Model Predicting Health, Estimated Among All Participants in the Exploratory Sample



Note. Indicators for latent constructs as determined in Research Questions 1 and 2 are not shown here for ease of presentation. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation. $^{*}p < .05$. Exact *p* levels available in accompanying table.

Figure 28. Weighted Standardized Path Coefficients for Structural Model Predicting Health, Estimated Among All Participants in the Cross-validation Sample



Note. Indicators for latent constructs as determined in Research Questions 1 and 2 are not shown here for ease of presentation. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and p levels when using WLSMV estimation. $^{*}p < .05$. Exact p levels available in accompanying table.

The fit of the model was adequate to good according to fit indices in both exploratory and cross-validation samples: χ^2 (88, 4226) = 585.126, $p < .0001$, CFI = .949, TLI = .965, RMSEA = .037 in the exploratory sample; χ^2 (126, 4225) = 1025.006, $p <$ .0001, CFI = .918, TLI = .954, RMSEA = .041 in the cross-validation sample. Results were similar between the exploratory and cross-validation samples, except for the direct effects of Financial Resources and Financial Strain on Self-rated Health. In the exploratory sample, Financial Resources had no significant direct effect on Self-rated Health, $b^* = .02$, $p = .62$; but in the cross-validation sample, the effect of Financial Resources on Self-rated Health was significant, $b^* = .12$, $p < .01$. In contrast, in the exploratory sample, the effect of Financial Strain on Self-rated Health was significant, $b^* = -.13$, $p < .01$; but it was nonsignificant in the cross-validation sample, $b^* = -.04$, $p =$ .38. Nonetheless, effects of both variables on Self-rated Health were in the same direction for both samples, and all of these effects were small in absolute size (Cohen, 1988; Keith, 2006). Chance differences in scores on variables in the exploratory and cross-validation samples may be significant only due to Add Health's large sample size; these differences may not be substantively meaningful.

It is also important to note that while *direct* effects of Financial Resources on Self-rated Health were small in size, Financial Resources appeared to have stronger *indirect* effect on Self-rated Health in both samples, given its strong effect on Financial Strain, Perceived SES, and Recent Perceived Control, and the significant effect of these variables, in turn, on Self-rated Health. The *indirect* effects of Occupational Rank,

Educational Attainment, and Financial Resources on Self-rated Health will be formally tested in Research Question 6.

Educational Attainment also had a significant, positive direct effect on Self-rated Health in both samples, $b^* = .11$, $p < .001$ in both models. This is interesting because it tells that Educational Attainment affected Self-rated Health apart from Educational Attainment's association with higher-status occupations and greater financial resources. Note that Recent Perceived Control significantly and positively affected Self-rated Health in both samples at $p < .001$, while Trait Perceived Control did not. Again, this lends validity to my modeling of these constructs as distinct, and has implications for which types of perceived control are useful for the young adult (experiential vs. ideological), in terms of predicting better health. Also, as expected, results remained very similar with the application of sampling weights.

Table 26

Standardized Estimates for Effects of Aspects of SES and the Psychological Variables and Constructs on Each Other and on Health Among All Participants in Each Half of the Sample, with and without Weights

	b^* for Exploratory Sample, unweighted (N = 4226)	b^* for Exploratory Sample, weighted (N = 4226)	b^* for Cross-Validation Sample, unweighted (N = 4225)	b^* for Cross-Validation Sample, weighted (N = 4225)
Direct Effects				
Occ Rank on Strain	0.06	0.03	0.03	0.04
Educ Attainment on Strain	-0.12***	-0.14***	-0.12***	-0.13***
Fin Resources on Strain	-0.59***	-0.56***	-0.57***	-0.59***
Occ Rank on Ladder	0.02	0.05	0.03	0.00
Educ Attainment on Ladder	0.19***	0.20***	0.21***	0.19***
Fin Resources on Ladder	0.38***	0.36***	0.36***	0.39***
Occ Rank on Recent Cont	0.05*	0.05	0.07*	0.04
Educ Attainment on Recent Cont	0.06**	0.10***	0.05*	0.06*
Fin Resources on Recent Cont	0.36***	0.35***	0.37***	0.39***
Occ Rank on Trait Cont	-0.03	0.01	-0.02	0.00
Educ Attainment on Trait Cont	-0.20***	-0.20***	-0.22***	-0.22***
Fin Resources on Trait Cont	-0.23***	-0.30***	-0.18***	-0.19***
Occ Rank on Health	-0.05*	-0.04	-0.04	-0.01
Educ Attainment on Health	0.11***	0.11***	0.11***	0.11***
Fin Resources on Health	0.04	0.02	0.08**	0.12**
Strain on Health	-0.07	-0.13**	-0.06	-0.04
Ladder on Health	0.09***	0.09***	0.09***	0.06**
Recent Cont on Health	0.21***	0.21***	0.21***	0.24***
Trait Cont on Health	-0.02	0.01	-0.01	0.00
Correlations				
Occ Rank with Educ Attainment	0.29***	0.30***	0.28***	0.28***
Occ Rank with Fin Resources	0.52***	0.52***	0.48***	0.49***
Educ Attainment with Fin Resources	0.37***	0.33***	0.36***	0.35***
Strain with Ladder	-0.15***	-0.16***	-0.23***	-0.22***
Strain with Recent Cont	-0.38***	-0.40***	-0.41***	-0.40***
Strain with Trait Cont	0.09**	0.09**	0.08*	0.11**
Ladder with Recent Cont	0.20***	0.23***	0.25***	0.26***
Ladder with Trait Cont	-0.07***	-0.10***	-0.12***	-0.14***
Rec Cont with Trait Cont	-0.46***	-0.51***	-0.48***	-0.51***
Model Fit				
df, N	146, 4226	88,4226	149, 4225	126, 4225
χ^2	1782.083	585.126	1993.610	1025.006
p for χ^2	< .0001	< .0001	< .0001	< .0001
RMSEA	0.051	0.037	0.054	0.041
CFI	0.929	0.949	0.911	0.918
TLI	0.961	0.965	0.953	0.954

Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and p levels when using WLSMV estimation. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .0001$.

Table 27

Unstandardized Estimates for Effects of Aspects of SES and the Psychological Variables and Constructs on Each Other and on Health Among All Participants in Each Half of the Sample, with and without Weights

	b (*SE*) for Exploratory Sample, unweighted (*N* = 4226)	*b* (*SE*) for Exploratory Sample, weighted (*N* = 4226)	*b* (*SE*) for Cross-Validation Sample, unweighted (*N* = 4225)	*b* (*SE*) for Cross-Validation Sample, weighted (*N* = 4225)
Direct Effects				
Occ Rank on Strain	0.38 (.22)	0.20 (.29)	0.23 (.24)	0.29 (.31)
Educ Attain on Strain	-0.05*** (.01)	-0.06*** (.01)	-0.05*** (.01)	-0.05*** (.01)
Fin Resources on Strain	-0.45*** (.03)	-0.38*** (.04)	-0.47*** (.04)	-0.48*** (.04)
Occ Rank on Ladder	0.25 (.27)	0.61 (.38)	0.43 (.30)	0.00 (.43)
Educ Attain on Ladder	0.15*** (.01)	0.16*** (.02)	0.16*** (.01)	0.15*** (.02)
Fin Resources on Ladder	0.57*** (.04)	0.49*** (.05)	0.59*** (.04)	0.62*** (.06)
Occ Rank on Recent Cont	0.25* (.13)	0.23 (.17)	0.38* (.15)	0.22 (.21)
Educ Attain on Recent Cont	0.02** (.01)	0.03*** (.01)	0.01* (.01)	0.02* (.01)
Fin Resources on Recent Cont	0.19*** (.02)	0.17*** (.02)	0.23*** (.02)	0.24*** (.03)
Occ Rank on Trait Cont	-0.10 (.09)	0.02 (.13)	-0.07 (.11)	0.00 (.14)
Educ Attain on Trait Cont	-0.04*** (.00)	-0.04*** (.01)	-0.05***(.00)	-0.05*** (.01)
Fin Resources on Trait Cont	-0.09*** (.01)	-0.11*** (.02)	-0.08*** (.01)	-0.08*** (.02)
Occ Rank on Health	-0.32* (.16)	-0.25 (.21)	-0.30 (.17)	-0.08 (.23)
Educ Attain on Health	0.05*** (.01)	0.05*** (.01)	0.05*** (.01)	0.05*** (.01)
Fin Resources on Health	0.04 (.03)	0.02 (.03)	0.07** (.03)	0.10** (.04)
Strain on Health	-0.07 (.04)	-0.13** (.05)	-0.06 (.04)	-0.04 (.05)
Ladder on Health	0.05*** (.01)	0.05*** (.01)	0.05*** (.01)	0.03** (.01)
Recent Cont on Health	0.32*** (.04)	0.31*** (.06)	0.30*** (.04)	0.33*** (.05)
Trait Cont on Health	-0.03 (.04)	0.02 (.05)	-0.02 (.04)	-0.01 (.06)
Covariances				
Occ Rank with Educ Attain	0.08*** (.01)	0.09*** (.01)	0.07*** (.01)	0.07*** (.01)
Occ Rank with Fin Resources	0.08*** (.01)	0.09*** (.01)	0.06*** (.01)	0.06*** (.01)
Educ Attain with Fin Resources	0.93*** (.06)	0.91*** (.08)	0.81*** (.06)	0.82*** (.08)
Strain with Ladder	-0.16*** (.03)	-0.17*** (.04)	-0.24*** (.03)	-0.23*** (.04)
Strain with Recent Cont	-0.15*** (.01)	-0.15*** (.02)	-0.17*** (.02)	-0.17*** (.02)
Strain with Trait Cont	0.03** (.01)	0.03* (.01)	0.02* (.01)	0.03** (.01)
Ladder with Recent Cont	0.17*** (.02)	0.19*** (.02)	0.22*** (.02)	0.24*** (.03)
Ladder with Trait Cont	-0.05*** (.01)	-0.07*** (.02)	-0.08*** (.01)	-0.10*** (.02)
Rec Cont with Trait Cont	-0.11*** (.01)	-0.12*** (.01)	-0.13*** (.01)	-0.14*** (.01)
Model Fit				
df, N	146, 4226	88,4226	149, 4225	126, 4225
χ^2	1782.083****	585.126****	1993.610****	1025.006****
RMSEA	0.051	0.037	0.054	0.041
CFI	0.929	0.949	0.911	0.918
TLI	0.961	0.965	0.953	0.954

Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation.
*$p < .05$. **$p < .01$. ***$p < .001$. ****$p < .0001$.

Predictive models for separate social groups. Next, the model was estimated in the cross-validation sample, separately by social group, with weights applied. Standardized and unstandardized results are shown in Tables 28 and 29, respectively. The predictive model had reasonable fit to the data according to all fit statistics for White men and women, Black women, and Latina women. For Black men and Latino men, the model had model good fit according to the RMSEA index (<.05 for both groups), but did not have reasonable fit according to CFI for Black men (CFI = .89), and according to the CFI and TLI for Latino men (CFI = .83, TLI = .86). No large and theoretically meaningful model modifications were offered by Mplus to bring these models to good fit for all fit indices. Future work should focus on creating better models of how SES relates to health for Black and Latino men.

Table 28

Weighted Standardized Estimates for Effects of Aspects of SES and the Psychological Constructs on Each Other and on Health in Each Social Group, Cross-validation Sample

	*b** for Black Men (*n* = 376)	*b** for Latino Men (*n* = 349)	*b** for White Men (*n* = 1166)	*b** for Black Women (*n* = 573)	*b** for Latina Women (*n* = 401)	*b** for White Women (*n* = 1360)
			Direct Effects			
Occ Rank on Strain	0.00	-0.32*	0.06	0.30*	0.09	-0.04
Educ Attain on Strain	0.10	-0.12	-0.19**	-0.03	-0.14	-0.17***
Fin Resources on Strain	-0.47***	-0.44***	-0.52***	-0.71***	-0.73***	-0.59***
Occ Rank on Ladder	0.07	0.16	-0.07	-0.05	-0.04	0.04
Educ Attain on Ladder	-0.07	0.01	0.28***	0.21***	0.15	0.22***
Fin Resources on Ladder	0.29**	0.39***	0.42***	0.32***	0.28	0.41***
Occ Rank on Recent Cont	0.22	0.11	0.00	0.12	0.11	0.02
Educ Attain on Recent Cont	-0.16	0.13	0.13**	0.01	0.15	0.08*
Fin Resources on Recent Cont	0.46***	0.25	0.45***	0.31*	0.18	0.35***
Occ Rank on Trait Cont	-0.01	-0.10	0.04	-0.07	0.11	-0.03
Educ Attain on Trait Cont	-0.18*	-0.34***	-0.19***	-0.17*	-0.31***	-0.19***
Fin Resources on Trait Cont	-0.26*	-0.11	-0.24***	-0.23*	-0.28*	-0.15**
Occ Rank on Health	0.01	0.05	-0.01	0.12	0.01	-0.03
Educ Attain on Health	0.15	0.09	0.10**	0.18**	0.09	0.10**
Fin Resources on Health	-0.02	-0.05	0.03	-0.17	0.09	0.22**
Strain on Health	-0.11	-0.32	-0.03	-0.20	0.06	-0.04
Ladder on Health	0.01	0.02	0.07	0.12*	0.13	0.06
Recent Cont on Health	0.32	0.13	0.27***	0.04	0.25*	0.22***
Trait Cont on Health	0.15	0.15	-0.02	-0.09	0.00	-0.08
			Correlations			
Occ Rank with Educ Attain	0.25**	0.33***	0.22***	0.31***	0.27***	0.33***
Occ Rank with Fin Resources	0.30***	0.44***	0.52***	0.48***	0.56***	0.46***
Educ Attain with Fin Resourc	0.37***	0.26**	0.23***	0.54***	0.34***	0.41***
Strain with Ladder	-0.45***	-0.01	-0.27***	-0.13	-0.41**	-0.10
Strain with Recent Cont	-0.44***	-0.64***	-0.41***	-0.45***	-0.40**	-0.42***
Strain with Trait Cont	0.12	0.31	0.13*	-0.17	0.02	0.18*
Ladder with Recent Cont	0.40***	-0.05	0.25***	0.27***	0.29***	0.27***
Ladder with Trait Cont	-0.15	-0.22*	-0.12**	0.01	0.00	-0.22***
Recent Cont with Trait Cont	-0.57***	-0.43***	-0.59***	-0.35***	-0.39***	-0.55***
			Model Fit			
df, N	41, 376	39, 349	68, 1166	62, 573	40, 401	84, 1360
χ^2	78.516	71.317	266.486	129.954	78.671	304.887
p for χ^2	< .001	< .01	< .0001	< .0001	< .0001	< .0001
RMSEA	0.049	0.049	0.05	0.044	0.049	0.044
CFI	0.885	0.833	0.932	0.957	0.901	0.932
TLI	0.904	0.863	0.939	0.967	0.914	0.960

Note. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .001$.

Table 29

Weighted, Unstandardized Estimates for Effects of Aspects of SES and the Psychological Variables and Constructs on Each Other and on Health in Each Social Group, Cross-validation Sample

	b (SE) for Black Men (n = 376)	*b (SE)* for Latino Men (n = 349)	*b (SE)* for White Men (n = 1166)	*b (SE)* for Black Women (n = 573)	*b (SE)* for Latina Women (n = 401)	*b (SE)* for White Women (n = 1360)
			Direct Effects			
Occ Rank on Strain	0.00 (0.90)	-6.43 (4.55)	0.42 (0.62)	2.04* (0.84)	0.75 (1.36)	-0.28 (0.40)
Educ Attain on Strain	0.04 (0.05)	-0.04 (0.05)	-0.07** (0.02)	-0.01 (0.03)	-0.06 (0.05)	-0.08*** (0.02)
Fin Resources on Strain	-0.39 (0.20)	-0.35** (0.13)	-0.57*** (0.09)	-0.63***(0.18)	-0.65** (0.25)	-0.42*** (0.07)
Occ Rank on Ladder	1.14 (1.42)	7.56 (7.18)	-0.99 (0.69)	-0.68 (1.15)	-0.68 (2.49)	0.53 (0.49)
Educ Attain on Ladder	-0.06 (0.07)	0.01 (0.06)	0.22*** (0.02)	0.16*** (0.04)	0.13 (0.07)	0.18*** (0.03)
Fin Resources on Ladder	0.51 (0.29)	0.72*** (0.21)	0.94*** (0.10)	0.59* (0.23)	0.51 (0.33)	0.54*** (0.09)
Occ Rank on Recent Cont	1.38 (0.88)	1.49 (2.16)	0.01 (0.35)	0.70 (0.67)	0.71 (0.88)	0.12 (0.27)
Educ Attain on Recent Cont	-0.05 (0.04)	0.03 (0.03)	0.04** (0.01)	0.00 (0.03)	0.05 (0.03)	0.03* (0.01)
Fin Resources on Recent Cont	0.32 (0.17)	0.14 (0.09)	0.35*** (0.06)	0.24* (0.11)	0.12 (0.10)	0.19*** (0.04)
Occ Rank on Trait Cont	-0.04 (0.44)	-1.44 (2.12)	0.17 (0.22)	-0.32 (0.45)	-0.50 (0.58)	-0.09 (0.16)
Educ Attain on Trait Cont	-0.04* (0.02)	-0.09** (0.03)	-0.04*** (0.01)	-0.04* (0.02)	-0.07*** (0.02)	-0.04*** (0.01)
Fin Resources on Trait Cont	-0.12 (0.07)	-0.06 (0.07)	-0.14*** (0.03)	-0.14 (0.07)	-0.13 (0.07)	-0.05* (0.02)
Occ Rank on Health	0.07 (0.96)	1.29 (4.84)	-0.06 (0.40)	0.99 (0.99)	0.13 (1.30)	-0.21 (0.27)
Educ Attain on Health	0.07 (0.04)	0.04 (0.05)	0.04** (0.02)	0.08** (0.03)	0.04 (0.04)	0.04** (0.02)
Fin Resources on Health	-0.02 (0.13)	-0.06 (0.21)	0.04 (0.07)	-0.17 (0.19)	0.09 (0.18)	0.15** (0.05)
Strain on Health	-0.13 (0.17)	-0.43 (0.56)	-0.03 (0.08)	-0.23 (0.23)	0.06 (0.20)	-0.04 (0.08)
Ladder on Health	0.00 (0.05)	0.01 (0.06)	0.03 (0.02)	0.07* (0.03)	0.07 (0.05)	0.03 (0.02)
Recent Cont on Health	0.46 (0.29)	0.26 (0.51)	0.39*** (0.12)	0.05 (0.18)	0.37 (0.20)	0.28*** (0.07)
Trait Cont on Health	0.31 (0.29)	0.27 (0.25)	-0.04 (0.10)	-0.15 (0.16)	0.01 (0.22)	-0.17 (0.10)
			Covariances			
Occ Rank with Educ Attain	0.06* (0.03)	0.02 (0.01)	0.05*** (0.01)	0.08*** (0.02)	0.06** (0.02)	0.10*** (0.01)
Occ Rank with Fin Resources	0.04 (0.02)	0.02 (0.01)	0.05*** (0.01)	0.05** (0.02)	0.06* (0.03)	0.08*** (0.02)
Educ Attain with Fin Resources	0.83* (0.41)	0.49* (0.19)	0.37*** (0.07)	1.12*** (0.31)	0.73* (0.35)	1.10*** (0.18)
Strain with Ladder	-0.62*** (0.15)	-0.01 (0.14)	-0.27*** (0.08)	-0.13 (0.10)	-0.43* (0.17)	-0.10 (0.06)
Strain with Recent Cont	-0.21** (0.07)	-0.16** (0.06)	-0.15*** (0.03)	-0.19*** (0.05)	-0.16* (0.07)	-0.18*** (0.03)

Strain with Trait Cont	0.04 (0.05)	0.08 (0.05)	0.04* (0.02)	-0.06 (0.04)	0.01 (0.04)	0.05* (0.02)
Ladder with Recent Cont	0.44** (0.16)	-0.03 (0.09)	0.19*** (0.04)	0.28*** (0.07)	0.32** (0.10)	0.25*** (0.04)
Ladder with Trait Cont	-0.12 (0.07)	-0.15* (0.08)	-0.07** (0.03)	0.01 (0.05)	0.00 (0.05)	-0.12*** (0.02)
Recent Cont with Trait Cont	-0.16***(0.04)	-0.10** (0.04)	-0.13*** (0.02)	-0.12*** (0.03)	-0.10*** (0.03)	-0.14*** (0.02)

Note. N, degrees of freedom, and model fit are the same as shown in Table 24. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .001$.

As in the predictive model estimated across all participants, Income had the strongest effects on Financial Strain, Perceived SES, and Recent Control, out of the three traditional SES constructs. This was true for all social groups. The effect of Educational Attainment on these psychological variables, however, differed by social group. Lower levels of Educational Attainment were associated with higher levels of Financial Strain for White men and women only. White men and women and Black women were the only groups for which higher levels of Educational Attainment resulted in higher levels of Perceived SES. Again, White men and women were the only groups for whom higher levels of Educational Attainment were associated with higher levels of Recent Control. Thus, we see that social group modified the associations among the variables and constructs. For all groups, lower levels of Educational Attainment and Financial Resources were associated with higher levels of Trait Control, which again is more ideological than the tangible, day-to-day experiences of control reflected by scores on the Recent Control construct.

Direct effects of aspects of SES on Self-rated Health also differed by social group. Financial Resources significantly affected Self-rated Health directly for White women only ($b^* = .22$, $p < .01$). For other groups, there was no significant direct effect of Financial Resources on Self-rated Health, though Financial Resources may still impact Self-rated Health *indirectly* for these groups—a question that will be addressed in Research Question 6. Educational Attainment was significantly and positively associated with Self-rated Health only for White men and women and Black women. Black women with higher levels of Perceived SES also tended to be higher in Self-rated Health, though

for other groups, there was no significant association between these variables. Recent Control was positively associated with Self-rated Health only for White men and women and for Latina women.

SUMMARY OF ANALYSES FOR RESEARCH QUESTION 5

The predictive model fit well in the exploratory and cross-validation samples, across all participants, and for most social groups in the cross-validation sample. Some fit indices were below the cutoff for reasonable for Black and Latino men, and no meaningful modifications were provided by Mplus. Future research should focus on creating adequate models of SES and health among Black and Latino young adult men.

In general, however, results were consistent between exploratory and cross-validation samples when the model was estimated across all participants. Among the traditional components of SES, Financial Resources had the strongest effects on Financial Strain, Perceived SES, and Recent Control, followed by Educational Attainment. Lower levels of Educational Attainment and Financial Resources were associated with higher levels of Trait Control. Financial Resources did not have a strong direct on Self-rated Health, but appeared to have stronger *indirect* effects through the psychological mediators. Higher levels of Perceived SES and Recent Control were associated with better Self-rated Health.

Some results differed by social group. Namely, while Financial Resources was consistently the strongest predictor of Financial Strain, Perceived SES, and Recent Control, the effect of Educational Attainment on these variables differed by social group, with the strongest beneficial effects of Educational Attainment found for White men and

women. Whites were the only race for which higher levels of Educational Attainment and Recent Control consistently benefited Health. Black women's Health was benefited by higher levels of Educational Attainment and Perceived SES.

Research Question 6: Do Financial Strain, Perceived SES, and Perceived Control factors/variables mediate the effect of Young Adulthood Occupational Rank, Educational Attainment, and Financial Resources on Self-rated Health?

To answer Research Question 6, indirect effects of Occupational Rank, Educational Attainment, and Financial Resources on Self-rated health through Financial Strain, Perceived SES, Recent Perceived Control, and Trait Perceived Control were assessed using the Mplus MODEL INDIRECT command. These indirect effects were requested in estimating the same model as in Research Question 5 first across all social groups, then separately by social group, using the cross-validation sample. Significance of the indirect effect indicated significant mediation. Table 30 displays significant and trend-level indirect effects for all participants and separately by social group. Trend-level indirect effects were included in the table so as to be generous in discovering mediating effects of SES on health, since literature suggests that this is an important aim in the current state of research on SES and health (e.g., Matthews et al., 2010; Price et al., 2002; Adler & Snibbe, 2003). All other indirect effects were nonsignificant and below trend level.

Table 30

Significant Indirect Effects on Health in Validation Sample, Weighted: Whole Sample and by Social Group

Pathway	Whole Validation Sample (n = 4225)		Black Men (n = 376)		Latino Men (n = 349)		White Men (n = 1166)		Black Women (n = 573)		Latina Women (n = 501)		White Women (n = 1360)	
	b *(SE)*	*b**	*b* *(SE)*	*b**	*b* *(SE)*	*b**	*b* *(SE)*	*b**	*b* *(SE)*	*b**	*b* *(SE)*	*b**	*b* *(SE)*	*B**
Occ Rank on Health														
Via Financial Strain														
Via Ladder														
Via Recent Control														
Via Trait Control														
Educ Attain on Health														
Via Financial Strain														
Via Ladder	.01** (.00)	.01**					.01* (.01)	.04*	.01† (.01)	.02†			.01† (.00)	.01†
Via Recent Control	.01* (.00)	.02*											.01* (.00)	.02*
Via Trait Control													.01† (.00)	.01†
Fin Resources on Health														
Via Financial Strain														
Via Ladder	.02** (.01)	.02**					.14** (.05)	.12*	.04† (.02)	.04†			.02† (.01)	.03†
Via Recent Control	.08*** (.02)	.09***											.05** (.02)	.08*
Via Trait Control														

Note. For ease of presentation, only significant and trend level indirect effects are shown.
$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Results showed that across all participants, there was significant mediation for the effects of Educational Attainment and Financial Resources on Self-rated Health through Perceived SES and through Recent Perceived Control. However, these effects differed by social group. For White men, Educational Attainment and Financial Resources both affected Self-rated Health indirectly through Perceived SES. For White women, Educational Attainment and Financial Resources both affected Self-rated Health indirectly through Perceived Control, with trend-level effects seen for indirect effects through Perceived SES. For Black women, Educational Attainment and Financial Resources both had trend-level indirect effects through Perceived Control.

Among Black men, Latino men, and Latina women, no indirect effects were found. Coupled with no significant direct effects of *any* of the variables and constructs on Self-rated Health for Black and Latino men, along with the poor CFI and TLI fit statistics for these groups, we see again that the relationship between aspects of SES and health for Black and Latino men is not being explained well by the model. This is in itself an interesting finding. It tells that while the current model fits well to the process of how SES relates to health among several social groups, it is not a good explanatory model for *all* groups.

Table 31 below summarizes the direct, indirect, and total effects of aspects of SES on Self-rated Health among all participants in the cross-validation sample. It can be seen that Occupational Rank had virtually no effect—neither direct nor indirect—on Self-rated Health. Note that very different pictures are seen for the ways in which Educational Attainment and Financial Strain affect Self-rated Health. Specifically, most of

Educational Attainment's total effect on Self-rated Health is direct rather than indirect, b^* = .11 compared to b^* = .03. The total effect of Educational Attainment on Health was still small to medium in absolute size, b^* = .14. For example, in order to move a young adult up in his or her Self-rated Health category (e.g., from poor to fair, or from fair to good), the young adult would have to achieve 7 additional credentials or partial credentials on the Add Health's Wave IV educational attainment scale, which would cost years of the participant's life.

The direct effect of Financial Resources on Self-rated Health was also small in size, b^* = .12. However, when indirect effects of Financial Resources on Self-rated Health were taken into account, b^* = .14, we see that Financial Resources had a medium-to large-sized total effect on Self-rated Health, b^* = 26. This total effect tells that for every 3.85 additional units of the latent Financial Resources construct, a young adult's Self-rated Health would rise to the next-higher category. Unfortunately, since the Financial Resources construct is unobserved rather than measured, this interpretation does not provide as clear a picture of the practical effects of financial resources on self-rated health. Nonetheless, it is sufficient to say that both educational attainment and financial resources affect self-rated health; for education, most of this effect is direct, while for financial resources, about half of the effect occurs through financial resources' effect on psychological variables.

Table 31

Standardized Direct, Indirect and Total Effects of Aspects of SES on Self-Rated Health, All Participants, Cross-validation Sample

Variable	Direct Effect *b**	Indirect Effect *b**	Total Effect *b**
Occupational Rank	-.01	.02	.01
Educational Attainment	.11	.03	.14
Financial Resources	.12	.14	.26
Financial Strain	-.04	-	-.04
Perceived SES	.06	-	.06
Recent Perceived Control	.24	-	.24
Trait Perceived Control	.00	-	.00

SUMMARY OF ANALYSES FOR RESEARCH QUESTION 6

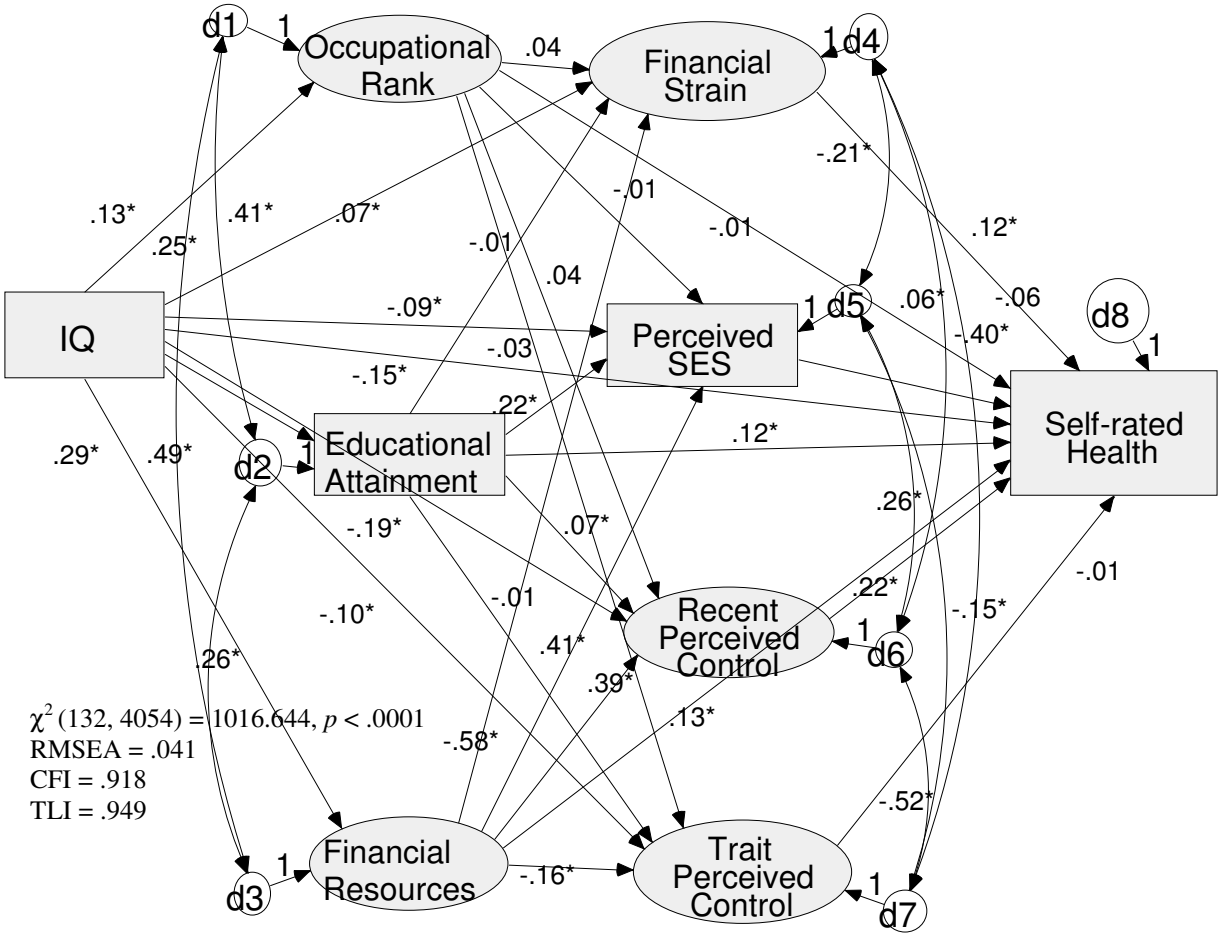
Tests for indirect effects of Occupational Rank, Educational Attainment, and Financial Resources on Health revealed four significant indirect paths across all participants: the effects of Educational Attainment and Financial Resources on Self-rated Health through Perceived SES and through Recent Perceived Control. Significance of the indirect paths differed by social group. The effects through Perceived SES held for White men, and the effects through Recent Perceived Control held for White women. No indirect effects were seen for Black or Latino men, or for Latina women. Better models are needed to explain the relationship between SES and health for Black and Latino men. Across all participants, educational attainment and financial resources both had sizable effects on self-rated health. While most of this effect was direct for education, about half of this effect was indirect (through the psychological variables) for financial resources.

Research Questions 7a and 7b

Research questions 7a and 7b were concerned with whether the effects of aspects of SES on health among young adults were different when potentially confounding variables—IQ and childhood SES—were included in the model. Specifically, I considered IQ as a potential common cause of both SES in young adulthood and health in young adulthood, and considered whether the relationships between young adulthood SES and health would be attenuated after controlling for IQ. Then, I considered whether effects of aspects of SES on health in young adulthood depended on, or were modified by, childhood SES. This was done by including interaction terms between childhood SES and aspects of SES in young adulthood in the model, and examining the significance of these interaction terms, as well as the consistency between this model and previous models without the interaction terms.

Research Question 7a: Do the effects of Young Adulthood Occupational Rank, Education, Financial Resources, Financial Strain, Perceived SES, and Perceived Control factors/variables persist when controlling for IQ? To answer Research Question 7a, I added IQ as a control variable in the final predictive model estimated across all participants in the cross-validation sample, which had weights applied. I then examined indirect and direct estimates produced by Mplus for their direction and significance, taking note of whether adding IQ changed any previous results. Figure 29 shows standardized path estimates for the model with IQ added as a control variable.

Figure 28. Weighted Standardized Path Coefficients for Structural Model Predicting Health, Estimated Among All Participants in the Cross-validation Sample, Controlling for IQ



Note. Indicators for latent constructs as determined in Research Questions 1 and 2 are not shown here for ease of presentation. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and *p* levels when using WLSMV estimation. $^{*}p < .05$. Exact *p* levels available in accompanying table.

Table 32 shows path estimates in both unstandardized and standardized forms. The structural model with IQ added as a control variable had good to reasonable fit according to all fit indices, χ^2 (132, 4054) = 1016.644, $p < .0001$, CFI = .918, TLI = .949, RMSEA = .041. Results showed that IQ at Wave I had a significant, positive effect on Occupational Rank, Educational Attainment, and Financial Resources at Wave IV, $b^* = .13$, $p < .001$ for Occupational Rank; $b^* = .41$, $p < .001$ for Educational Attainment; $b^* = .29$, $p < .001$ for Financial Resources. This means that Add Health participants with higher IQs tended to obtain better jobs, higher levels of education, and earn more money. Comparing these standardized effects tells that of these three aspects of SES, IQ had its strongest effect on educational attainment.

IQ also had significant effects on Financial Strain, Perceived SES, and Trait Control, controlling for aspects of SES. Interestingly, these effects were in a direction that is perhaps counterintuitive, with lower IQs directly associated with less financial strain, higher perceptions of SES, and higher levels of trait control. IQ had no significant direct effect on Recent Control, $b^* = -.01$, $p = .63$. Also, IQ had no significant, direct impact on Health, $b^* = -.03$, $p = .26$. This suggests that IQ is not truly a common cause of SES and Health in the current data.

Other direct effects in the model remained similar to those found in previous predictive models. Occupational Rank, Educational Attainment, and Financial Resources were significantly correlated with each other, even when controlling for IQ; Financial Resources had the strongest effects on Financial Strain, Perceived SES, and Recent Control, among traditional indicators of SES; and lower levels of Educational Attainment

and Financial Resources were associated with higher levels of Trait Control. Also, effects of variables and constructs on Health remained similar to those in previous predictive models, with Educational Attainment having a significant, positive effect on Health; and Perceived SES and Recent Control both also contributing positively to Health. Financial Strain no longer had a significant, negative impact on health, but its effect was in the same direction, $b^* = -.06$, $p = .053$.

Table 32

Unstandardized and Standardized Estimates for Structural Model Controlling for IQ

	b	*SE*	*b**
Direct Effects			
PVT on Occ Rank	0.00***	0.00	0.13***
PVT on Educ Attain	0.06***	0.00	0.41***
PVT on Fin Resources	0.02***	0.00	0.29***
Occ Rank on Strain	0.26	0.31	0.04
Educ Attain on Strain	-0.06***	0.01	-0.15***
Fin Resources on Strain	-0.48***	0.05	-0.58***
PVT on Strain	0.00*	0.00	0.07*
Occ Rank on Ladder	-0.19	0.42	-0.01
Educ Attain on Ladder	0.17***	0.02	0.22***
Fin Resources on Ladder	0.66***	0.07	0.41***
PVT on Ladder	-0.01***	0.00	-0.09***
Occ Rank on Recent Cont	0.20	0.22	0.04
Educ Attain on Recent Cont	0.02*	0.01	0.07*
Fin Resources on Recent Cont	0.26***	0.03	0.39***
PVT on Recent Cont	0.00	0.00	-0.01
Occ Rank on Trait Cont	-0.04	0.13	-0.01
Educ Attain on Trait Cont	-0.04***	0.01	-0.19***
Fin Resources on Trait Cont	-0.07***	0.02	-0.16***
PVT on Trait Cont	0.00***	0.00	-0.10***
Occ Rank on Health	-0.10	0.23	-0.01
Educ Attain on Health	0.05***	0.01	0.12***
Fin Resources on Health	0.11**	0.04	0.13**
Strain on Health	-0.06	0.05	-0.06
Ladder on Health	0.03*	0.01	0.06*
Recent Cont on Health	0.30***	0.05	0.22***
Trait Cont on Health	-0.02	0.06	-0.01
PVT on Health	-0.00	0.00	-0.03
Covariances			
Occ Rank with Educ Attain	0.06***	0.01	0.25***
Occ Rank with Fin Resources	0.06***	0.01	0.49***
Educ Attain with Fin Resources	0.53***	0.06	0.26***
Strain with Ladder	-0.23***	0.04	-0.21***
Strain with Recent Cont	-0.18***	0.02	-0.40***
Strain with Trait Cont	0.04**	0.01	0.12**
Ladder with Recent Cont	0.25***	0.03	0.26***
Ladder with Trait Cont	-0.10***	0.02	-0.15***
Rec Cont with Trait Cont	-0.14***	0.01	-0.52***
Model Fit			
df, N		132, 4054	
χ^2		1016.644****	
RMSEA		0.041	
CFI		0.918	
TLI		0.949	

Note. $N = 4054$. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and p levels when using WLSMV estimation. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .0001$.

Additionally, indirect effects found in previous predictive models held even when controlling for IQ: Educational Attainment's effect on Health was mediated by both Perceived SES, $b^* = .01$, $p < .05$, and Recent Control, $b^* = .02$, $p < .05$; and Financial Resources' effect on Health was also mediated by both Perceived SES, $b^* = .02$, $p < .05$, and Recent Control, $b^* = .09$, $p < .001$. The new model with IQ added also revealed additional indirect paths, shown in Table 33. For ease of presentation, only significant and trend-level indirect effects are listed; all other indirect effects were *ns*.

Table 33

Weighted Unstandardized and Standardized Indirect Paths for the Effects of IQ, Occupational Rank, Educational Attainment, and Financial Resources on Health in the Cross-validation Sample Across All Participants

	Unstand-ardized Path Coefficient *b*	*SE*	Standardized Path Coefficient b^*
Educ Attainment on Health Via Ladder	.01*	.00	.01*
Educ Attainment on Health Via Recent Control	.01*	.00	.02*
Fin Resources on Health Via Ladder	.02*	.01	.02*
Fin Resources on Health Via Recent Control	.08***	.02	.09***
IQ on Health Via Educ Attainment	.00***	.00	.05***
IQ on Health Via Fin Resources	.00**	.00	.04**
IQ on Health Via Ladder	.00*	.00	-.01*
IQ on Health Via Educ Attainment and Ladder	.00*	.00	.01*
IQ on Health Via Educ Attainment and Recent Control	.00*	.00	.01*
IQ on Health Via Fin Resources and Ladder	.00*	.00	.01*
IQ on Health Via Fin Resources and Recent Control	.00***	.00	.03***

Note. $N = 4054$. Table shows significant and trend-level indirect effects only for parsimony. All other indirect paths were *ns*.

Research Question 7b: Are the effects of adult Occupational Rank, Educational Attainment, Financial Resources, Financial Strain, Perceived SES, and

Perceived Control factors/variables on health moderated by Childhood SES? To answer Research Question 7a, I ran two additional structural equation models that built from the model estimated in Research Question 6, which was estimated in the cross-validation sample and had sampling weights applied. In the first of these two new models, I added an interaction between Parental Educational Attainment and Young Adulthood Educational Attainment, along with the main effect for Parental Educational Attainment. (All terms involved in interactions were centered before being cross-multiplied.) Again note that Add Health items indicating level of educational attainment for participants and their parental respondents marked completion (or partial completion) of various educational credentials on an ordered scale. The significance of the Parental Education x Young Adulthood Education term in its effects on the psychological mediators and on Health would indicate that the effects of level of education attained by Add Health respondents were moderated by, or depended on, the level of education attained by their parents. In other words, significance of this interaction term would indicate that the process by which education affects health among Add Health participants is not the same for respondents of various childhood SES backgrounds, when childhood SES is indicated by parents' level of educational attainment.

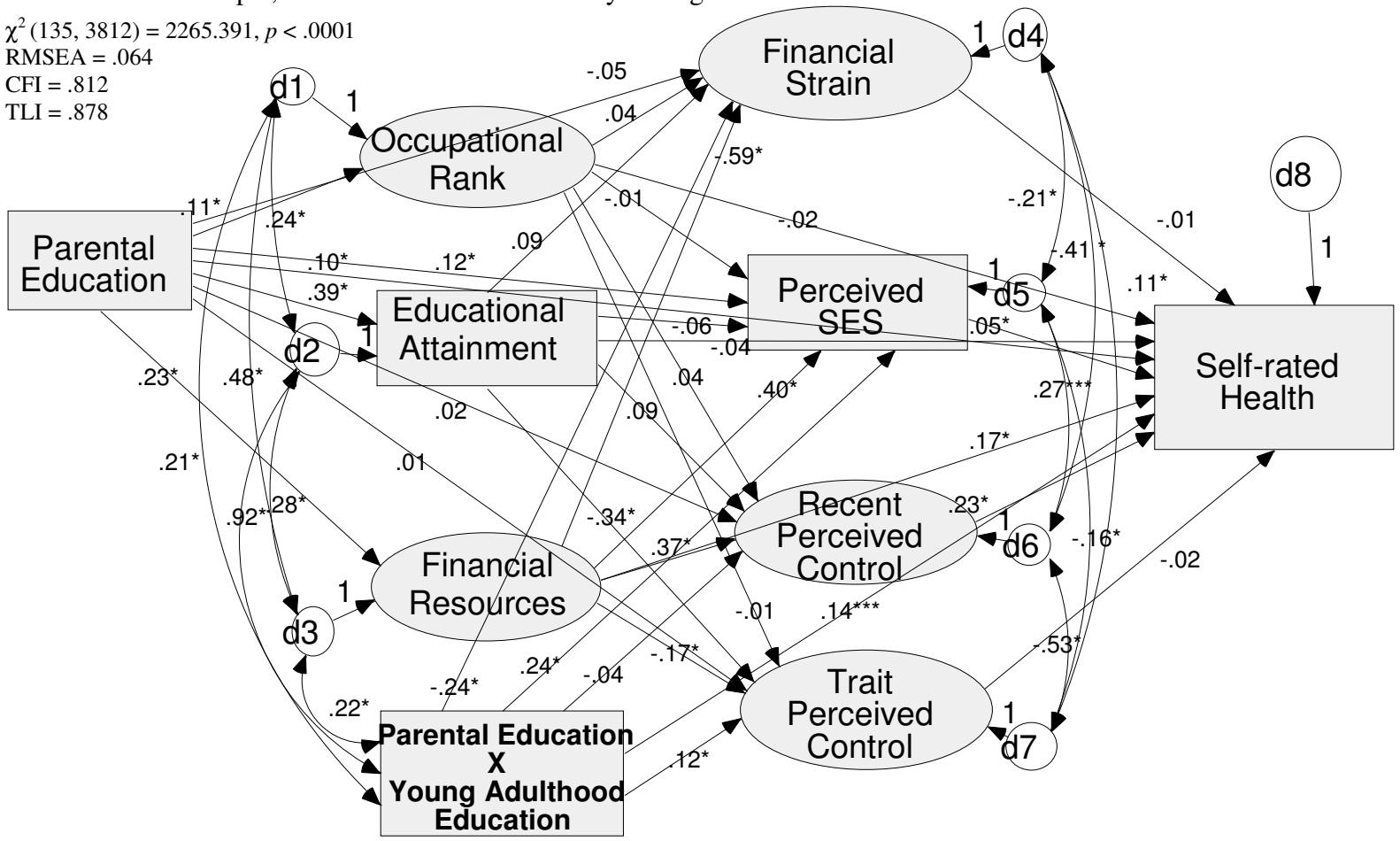
In the second model, I added an interaction between Family Income to Needs Ratio reported by the parental respondent at Wave I and Household Income reported by the participant him/herself at Wave IV. As mentioned in Chapter 2, a family income to needs ratio is a measure of depth of poverty. It is a ratio between self-reported household income in a given year and the poverty cutoff set by the U.S. Department of Health and

Human Services for a given year and a given family size (Huston et al., 1994). A ratio below 1.0 indicates that a family does not have the means to provide for its members' basic needs of food, clothing, shelter, and care (Mirowsky & Ross, 2003); a ratio above 1.0 indicates that a family does have the means to provide for its members' basic needs. (In the Add Health data, poverty ratios ranged from 0 to 135.73, $M = 3.67$, $SD = 4.49$.) Poverty status is an important predictor of outcomes for children (Huston et al., 1994), and the model created here provides estimates of the direct effects of Wave I family poverty status on aspects of SES and health in young adulthood. Additionally, significance of the interaction term created between Family Income to Needs Ratio at Wave I and Household Income at Wave IV would indicate that the impact of participants' Household Income on the psychological variables and/or Health is moderated by, or depends on, the poverty status of one's family. In other words, a significant interaction term would indicate that the effects of participants' household incomes are not the same for participants with different histories of family poverty during their youth.

Figure 30 shows standardized estimates for the first model, which focused on the interaction between Parental Educational Attainment and Young Adulthood Educational Attainment. This model fit reasonably well according to the RMSEA index, RMSEA = .064. However, it had questionable fit according to the CFI and TLI indices, CFI = .81, TLI = .88, with these indices slightly below the cutoff for reasonable fit, .90. Thus, results of this model should be interpreted with caution. It was not clear from modification indices produced by Mplus that this first model could be improved in theoretically meaningful ways. Results from Mplus showed that the second model (in

which Family Income to Needs Ratio was interacted with Household Income) fit very poorly to the data (CFI = .57, TLI = .71, RMSEA = .11). Modifications suggested by Mplus did not highlight how the second model could be improved in theoretically meaningful ways. Because of the very poor fit, path estimates and covariances produced by Mplus for the second model are not trustworthy and are not presented here.

Figure 30. Weighted Standardized Path Coefficients for Structural Model Predicting Health, Estimated Among All Participants in the Validation Sample, with Parental Educational by Young Adulthood Education Interaction



Note. Indicators for latent constructs as determined in Research Questions 1 and 2 are not shown here for ease of presentation. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and p levels when using WLSMV estimation. $^{*}p < .05$. Exact p levels available in accompanying table.

Turning to the results for the first model estimated for Research Question 7b, which focused on the interaction between Young Adulthood Educational Attainment and Parental Educational Attainment, we see that most estimates in the model were similar to those in previously-estimated models (see Table 34). As in previous models, Occupational Rank, Educational Attainment, and Financial Resources were all significantly intercorrelated, all *p*s < .001. Financial Resources had the strongest effects on the psychological mediators relative to the other traditional components of SES, with higher levels of Financial Resources associated with lower levels of Financial Strain, higher levels of Perceived SES, and higher levels of Recent Control. Lower levels of Educational Attainment and Financial Resources were associated with higher levels of Trait Control. Financial Resources maintained its indirect effects on Health through Perceived SES, $b^* = .02$, $p < .05$, and through Recent Control, $b^* = .08$, $p < .001$. Indirect effects of Educational Attainment on Health through Perceived SES and Recent Control, however, were no longer significant, $b^* = .00$, $p = .26$, and $b^* = .02$, $p = .27$, respectively. Higher levels of Recent Control and Perceived SES were also significantly associated with better Health, as in previous models.

Table 34

Unstandardized and Standardized Estimates for Structural Model Interacting Parental Educational Attainment with Young Adulthood Educational Attainment

	Unstandardized Coefficient *b*	*SE*	Standardized Coefficient *b**
Direct Effects			
Parental Ed on Occ Rank	0.01***	0.00	0.11***
Parental Ed on Educ Attain	0.39***	0.02	0.39***
Parental Ed on Fin Resources	0.11***	0.02	0.23***
Occ Rank on Strain	0.31	0.32	0.04
Educ Attain on Strain	0.04	0.03	0.09
Fin Resources on Strain	-0.49***	0.05	-0.59***
Parental Ed on Strain	-0.02	0.02	-0.05
Par Ed X Young Adult Ed on Strain	-0.02***	0.01	-0.24***
Occ Rank on Ladder	-0.07	0.44	-0.01
Educ Attain on Ladder	-0.05	0.04	-0.06
Fin Resources on Ladder	0.66***	0.07	0.40***
Parental Ed on Ladder	0.10***	0.02	0.12***
Par Ed X Young Adult Ed on Ladder	0.03***	0.01	0.24***
Occ Rank on Recent Cont	0.21	0.22	0.04
Educ Attain on Recent Cont	0.03	0.02	0.09
Fin Resources on Recent Cont	0.24***	0.03	0.37***
Parental Ed on Recent Cont	0.01	0.01	0.02
Par Ed X Young Adult Ed on Recent Cont	0.00	0.00	-0.04
Occ Rank on Trait Cont	-0.04	0.14	-0.01
Educ Attain on Trait Cont	-0.07***	0.02	-0.34***
Fin Resources on Trait Cont	-0.08***	0.02	-0.17***
Parental Ed on Trait Cont	0.00	0.01	0.01
Par Ed X Young Adult Ed on Trait Cont	0.00*	0.00	0.12*
Occ Rank on Health	-0.16	0.24	-0.02
Educ Attain on Health	-0.02	0.02	-0.04
Fin Resources on Health	0.15***	0.04	0.17***
Strain on Health	-0.01	0.05	-0.01
Ladder on Health	0.03*	0.01	0.05*
Recent Cont on Health	0.31***	0.06	0.23***
Trait Cont on Health	-0.04	0.06	-0.02
Parental Ed on Health	0.04***	0.01	0.10***
Par Ed X Young Adult Ed on Health	0.01**	0.00	0.14**
Covariances			
Occ Rank with Educ Attain	0.06***	0.01	0.24***

Occ Rank with Fin Resources	0.06***	0.01	0.48***
Educ Attain with Fin Resources	0.57***	0.06	0.28***
Par Ed X Young Adult Ed with Occ Rank	0.32***	0.04	0.21***
Par Ed X Young Adult Ed with Educ Attain	23.53***	0.53	0.92***
Par Ed X Young Adult Ed with Fin Resources	2.88***	0.35	0.22***
Strain with Ladder	-0.22***	0.04	-0.21***
Strain with Recent Cont	-0.18***	0.02	-0.41***
Strain with Trait Cont	0.04**	0.01	0.11**
Ladder with Recent Cont	0.25***	0.03	0.27***
Ladder with Trait Cont	-0.11***	0.02	-0.16***
Rec Cont with Trait Cont	-0.14***	0.01	-0.53***
Model Fit			
df, N		135, 3812	
χ^2		2265.391****	
RMSEA		0.064	
CFI		0.812	
TLI		0.878	

Note. N = 3812. Degrees of freedom were adjusted by the Mplus 5.2 program to provide correct Chi-Square values and p levels when using WLSMV estimation. Significant interaction effects are shaded in grey. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. $^{****}p < .0001$.

While most of the previous findings did not change with the addition of the interaction term, new findings emerged. Participants who had parents with higher levels of Parental Educational Attainment achieved better jobs, $b^* = .11$, $p < .001$; higher levels of educational attainment by young adulthood, $b^* = .39$, $p < .001$; and earned more money, $b^* = .23$, $p < .001$. Participants with better-educated parents also experienced higher levels of Perceived SES, $b^* = .12$, $p < .001$, which is interesting because this estimate had controlled for participants' own current Occupational Rank, Educational Attainment, and Financial Resources. Participants with better-educated parents also experienced better Self-rated Health, $b^* = .10$, $p < .001$. This finding corroborates research stating that Childhood SES has persistent effects across the life course (APA, 2007). Additionally, adding Parental Educational Attainment as a main effect in the

model introduced several new, longer chains of indirect effects, which shed light on the process of *how* aspects of SES affect health (see Table 35).

Table 35

Weighted Unstandardized and Standardized Indirect Paths for the Effects of Parental Educational Attainment and Young Adulthood Occupational Rank, Educational Attainment, and Financial Resources on Health in the Cross-validation Sample Across All Participants

	Unstandardized Path Coefficient *b*	*SE*	Standardized Path Coefficient b^*
Fin Resources on Health Via Ladder	.02*	.01	.02*
Fin Resources on Health Via Recent Control	.07***	.02	.08***
Parental Educational Attainment on Health Via Fin Resources	.02***	.01	.04***
Parental Educational Attainment on Health Via Fin Resources and Ladder	.00*	.01	.01*
Parental Educational Attainment on Health Via Fin Resources and Recent Control	.01***	.00	.02***

Note. $N = 3812$. Table shows significant and trend-level indirect effects only for parsimony. All other indirect paths were *ns*.

Four interaction effects also emerged, highlighted in grey in Table 34. These were interactions between Young Adulthood Educational Attainment and Parental Educational Attainment on Financial Strain, Perceived SES, and Trait Control (three of the psychological mediators), as well as on Self-rated Health. Standardized coefficients showed that these interaction effects were small to medium in effect size. Unstandardized

coefficients for these interaction terms are also available in Table 34. The unstandardized versions of these coefficients may be these may be preferable for interpretation because software packages do not always provide correct standard errors for standardized interaction terms (Bollen, 1989, p. 125; Friedrich, 1982; Preacher, 2010). The significance of the interaction term on four of the endogenous variables in the model tells that Parental Educational Attainment can be considered a confounding variable in the relationship between aspects of SES and Health, and may be important to include in future models of SES and Health.

There are several methods for probing significant interactions between two continuous variables in a regression context (Keith, 2006). One method is to divide participants into groups based on scores for one of the variables in the interaction (such as +1 *SD*, 0 *SD*, and -1 *SD* or other meaningful cutoffs such as those for clinical definitions), then plot mean scores on the dependent variable for each of these groups, across levels of the other variable in the interaction. This is the method I used to probe the interaction between Parental Educational Attainment and Young Adulthood Educational Attainment on Young Adulthood Health. In doing so, I categorized both Parental Educational Attainment and Young Adulthood Educational Attainment variables into four categories. The latter was necessary to ensure that sufficient numbers of participants fell into each of the categories of Parental Educational Attainment, in order to obtain mean Health scores for each category with sufficient precision.

Figure 31 displays a graph of mean Self-rated Health scores for young adults with four different levels of educational attainment: high school diploma or less, some

education past high school but no college degree, college degree, and graduate degree. Means were plotted for each of these groups of young adults, separately by their parental respondent's self-reported level of education, in order to determine how Parental Educational Attainment moderated the effect of Young Adulthood Educational Attainment on Health.

Figure 31. Average Self-rated Health Score by Young Adulthood Educational Attainment for Participants from Families of Different Levels of Educational Attainment

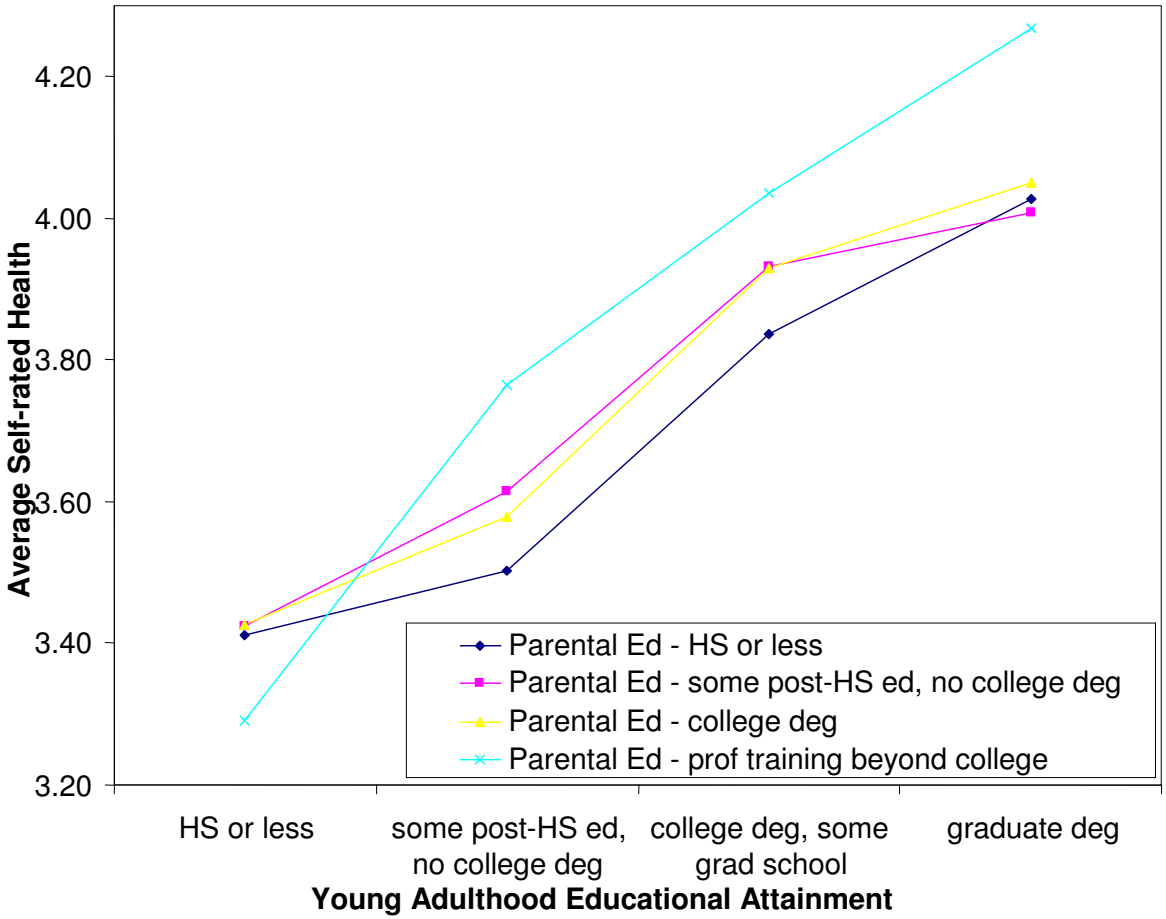


Figure 31 displays the main effect of Young Adulthood Educational Attainment on Health, with mean Health scores raising as one moves from left to right along the x-axis. The graph also clearly shows a main effect for Parental Educational Attainment on Health, with the plots for participants whose parents had professional training beyond college generally higher than the other plots, and the plots for participants whose parents had a high school degree or less generally the lowest. The interaction between Parental Educational Attainment and Young Adulthood Educational Attainment on Health appears to manifest itself among Add Health participants who have achieved low levels of education, plotted on the left-hand side of the x-axis. Particularly, it seems that participants whose parents are highly educated (having pursued professional training beyond college), but have achieved only a high school degree of less themselves, have particularly poorer health. While future research should address the legitimacy of this interpretation, this finding does make sense in that these participants' underachievement could be health-related. Disability and disease are not exclusive to low-SES youth, and it seems that among low-achieving young adults from highly educated families, there may be greater prevalence of disability or disease that is related to the underachievement.

Significant interactions between Parental Educational Attainment and Young Adulthood Educational Attainment on the psychological mediators (Financial Strain, Perceived SES, and Trait Control) are not probed here because two of these constructs (Financial Strain and Trait Control) are latent, complicating the graphing of mean scores for these dependent variables. Other traditional methods for probing these interactions, such as constructing separate equations for participants falling into each of the Parental

Educational Attainment groups, were also difficult to use because these variables are part of a latent variable system—that is, they are correlated with each other and regressed on Occupational Rank, Educational Attainment, and Financial Resources, which are in turn regressed on the exogenous variable of Parental Educational Attainment (see Figure 30). In other words, more than one equation is reflected by the diagram in Figure 30, and it is unlikely that these equations can be simplified in a way that would make the interaction between Parental Educational Attainment and Young Adulthood Educational Attainment easy to interpret. At this point, we can say that the effect of Educational Attainment on the psychological mediators is *not* the same for participants of all socioeconomic family backgrounds. A next step in this research will be to incorporate means modeling of the latent variables, which may make probing these interactions easier to do.

SUMMARY OF ANALYSES FOR RESEARCH QUESTIONS 7A AND 7B

Adding IQ as a potential common cause of SES and Health in Young Adulthood did not change previously-found relationships among variables in the model. Additionally, new results emerged from the addition of IQ to the model: While IQ had no significant *direct* effect on Health, it did have significant *indirect* effects on Health. Participants with higher IQs tended to have significantly higher-level Occupations, to achieve higher levels of education by young adulthood, and make more money. Adding IQ to the model thus introduced longer chains of indirect effects. One highly significant indirect effect of IQ on Health was through its positive effect on Financial Resources, which in turn had a positive effect on Recent Control, which in turn had a positive effect on Health. As a whole, results tell that IQ is not necessarily a common cause of aspects of

SES and Health, but can still help illuminate the processes by which effects of SES on Health occur.

While the model investigating interaction effects between Family Income to Needs Ratio and Household Income had very poor fit, the model investigating interaction effects between Parental Education and Young Adulthood Educational Attainment had reasonable fit according to the RMSEA index. Participants with better-educated parents achieved higher levels of Occupational Rank, Educational Attainment, and Financial Resources; had higher levels of Perceived SES; and had better Self-rated Health. Again, adding Parental Educational Attainment to the predictive model introduced new, longer chains of indirect effects of aspects of SES on Health. Parental Educational Attainment also moderated the effect of Young Adulthood Educational Attainment on three of the four psychological mediators and on Self-rated Health. These results strongly suggest that the process of how education affects health does not work in the same way for young adults of different family SES backgrounds. This tells that childhood SES does confound the relationships between aspects of SES and health because of its role as a moderating variable. That is, statements of how educational attainment affects health should be qualified with information on young adults' SES of origin.

Chapter 12: Discussion

This dissertation aimed to shed light on the link between SES and health among young adults by examining the components of SES and their links with health for a nationally representative sample of young adults. In reaching this overarching goal, I estimated measurement and structural models separately by social group, with the understanding that the meaning of SES components, and the relationships of these components of SES with health, are not thought to be the same for all U.S. social groups (Muhammad et al., 2004; APA, 2007; Chen et al., 2004; Price et al., 2002). I also examined mediators of the relationships of the components of SES with health to unravel the "mystery" of *how* SES affects health among young adults (e.g., Kaplan & Lynch, 1997; Adler et al., 1994; Marmot et al., 1991; Angell, 1993; Adler & Snibbe, 2003). Finally, as an extension, I explored potential confounding variables in the SES-health relationship (Bradley & Corwyn, 2002; APA, 2007). Shedding light on the relationship between SES and health among young adults is important because this is a stage in the life course when humans have a considerable amount of agency in determining a trajectory for their SES and health outcomes (Mirowsky & Ross, 2003; Elder, 1985, 1994), so it is an appropriate time for interventions aimed to improve the health trajectories of these young adults.

The Nature of Health and SES-related Constructs

The central variables in this dissertation were Self-rated Health, three aspects of SES (Occupational Rank, Educational Attainment, and Financial Resources), and three psychological variables (Financial Strain, Perceived SES, and Perceived Health) that are

thought to mediate the impact of aspects of SES on health. Each of these variables presented certain complexities for this dissertation's investigation of the SES-health relationship, including that each was measured through self-report, and that many of these constructs differed in their measurement across social groups. These important considerations will be discussed for each set of variables, in turn.

Self-rated Health. Self-rated health was the main outcome of interest—a valuable outcome because it reflects a condition of optimal well-being (Oxford English Dictionary, 2000; American Heritage Dictionary of the English Language, 1992; WHO, 2000; Stedman's Medical Dictionary, 2000). It is important to note that the self-rated health construct measured in this dissertation is not a clinical diagnosis of a health condition, but rather it involves perception (Mirowsky & Ross, 2003). Self-rated health scores may be inaccurate compared to biological measurements, with personal assessments of health dependent on one's reference group. For example, obese youth attending heavier schools are less likely to realize that they are overweight (Brown, Evans, Mirchandani, Kelder, & Hoelscher, 2010). Ratings can also have different meaning for different social groups; for example, a rating of "poor" health is thought to reflect a worse underlying condition for men compared to women, and is more predictive of mortality (Idler & Benyamini, 1997).

Upward bias for self-rated health was seen in the data used for this dissertation, with a mean self-rated health score of 3.67 points across all participants, which reflects an average self-rating of "good" to "very good" health. This upward bias was also seen in the distribution of scores. The most frequently-chosen rating was "very good," and the

top two self-rated health categories were over-utilized relative to the bottom two categories (58.12% vs. 9.59%). This upward bias was seen for all genders and racial/ethnic groups. It is possible, however, that the good overall health of the current sample is reflective of the generally good state of health of young adults, compared to older adults (Krause & Jay, 1994). The good overall state of health among young adults in this dissertation's sample raises question about whether models of the SES-health relationship are valid among young adults; yet, there was variation on scores for the self-rated health item of almost a full point on the scale (*SD* = .92). Further, scores on the item were not so skewed to the left to warrant transformation of this variable prior to analysis.

As previously discussed, despite the subjectivity of the self-rated health item, measures of self-rated health have been shown to have good validity and reliability, correlating highly with objective measures of health and with physicians' ratings of overall health (Mirowsky & Ross, 2003; Davies & Ware, 1981). Moreover, the self-rated health item is global, capturing the respondent's state on a variety of aspects of health with a singular item.

Aspects of SES. As with the construct of self-rated health, the age of the sample is critical in understanding the meaning of the SES constructs. Young adulthood is a time in the life course when humans are just beginning to "possess" their own SES—when scores on items related to occupation, education, and income measure social characteristics of the respondent him- or herself, rather than of parental proxies (Liu et al., 2008). Yet, in young adulthood, household income can still partially consist of income from one's parents. Similarly, persons in their late 20s or early 30s may still live

with their parents. Young adults living at home or receiving income from their parents may enjoy better health as a result of these resources, while not being particularly high in their own socioeconomic characteristics. SES is also not a very stable characteristic among young adults; in just one additional year of life, a young adult may achieve a graduate school degree, or begin his or her first job, and thus rise substantially on measures of SES. These limitations must be kept in mind in understanding the models estimated in this dissertation. Despite these complexities, young adulthood is an important time to study the SES-health link because it is a time when one's health and SES trajectories are primarily one's own responsibility, with considerable potential for change or improvement across time (Elder, 1985; 1994).

Another important consideration about the SES constructs used in this dissertation is that aspects of SES did not have the same meaning for participants of all social groups. The measurement invariance of the SES constructs across social groups is one reason why it was important to estimate models separately by social group, and to exercise caution in comparing results of models across groups. According to Keith (2006), it is illogical to compare the effects of one construct on another across groups if the constructs themselves do not have the same meaning. For example, when we state that financial resources had the strongest direct effects on health among White women, we must remember that the financial resource construct had quite different meanings for different social groups. Therefore, comparisons across groups about which effects were significant and nonsignificant are qualitative statements only, not formal quantitative comparisons.

As mentioned, the financial resources construct had different meaning for various social groups; this is a weakness in that it precludes direct comparison of the effect of financial resources on health across groups. Notably, the loading of the personal earnings item was lower for women than for men, with the highest loading for the item among women being $\lambda = .23$, while loadings for this item ranged from $\lambda = .42$ to $\lambda = .68$ among men. The highest loading for the personal earnings item was among White men. In fact, White men were the only group for which the personal earnings item loaded more highly than the household income item. This suggests that for some social groups, financial resources depend greatly on the earnings of one's spouse, but White men rely mostly on themselves for their financial resources.

Likewise, there was not support for measurement invariance of the Occupational Rank construct across social groups. One strength of the construct is that its item loadings matched closely with theory on what "good" versus "bad" jobs are. Across social groups, the strongest indicators of occupational rank were those relating to job benefits—health insurance, paid vacation and sick time, and retirement benefits. This finding is in line with the distinction made by Angel, Angel, & Montez (2009) that good jobs in the U.S. not only pay well, but also provide workers with the security of having employer-based health insurance for one's family, living a life of relative comfort, and continuing to do so in retirement; while bad jobs, by definition, not only pay poorly, but do not offer employee benefits, leaving employees with inadequate health care and an inability to retire comfortably. Despite this common characteristic of the nature of the Occupational Rank construct across socials groups, as stated, there was not support for measurement

invariance of the construct across groups. Thus, caution should be extended when comparing estimates of the impact of Occupational Rank on the other constructs across social groups. However, this may be less of a concern because for no group did Occupational Rank significantly affect Self-rated Health.

Psychological Mediators. Support for measurement invariance was also not found for any of the latent psychological variables thought to mediate the effect of SES on health. This is a weakness in that, again, direct comparisons of these pathways across social groups are not feasible. Note that in future research, less stringent standards may be applied for the fit indices used in assessing fit of the models to the data. Had less stringent standards been used (such as .08 instead of .05 for the RMSEA index, and .90 for the CFI and TLI indices), support for measurement invariance may have been declared more often.

One notable aspect of the measurement model for perceived control was that perceived control items factored into two separate constructs. One of these constructs reflected recent experiences of control, while the other construct reflected a trait-like form of perceived control. This is a strength in that it provides a nuanced picture of the perceived control construct, including how each of these constructs relates to aspects of SES and to health. For example, while educational attainment and financial resources were positively related to scores on the Recent Control construct, they were negatively related to scores on the Trait Control construct. Additionally, scores on Recent Control were significantly and positively associated with Self-rated Health, whereas scores on

Trait Control had no significant association with Self-rated Health. These findings are entirely in accord with previous research.

Several studies have demonstrated that humans tend to possess concrete and abstract forms of control. Graham (1994) stated that while the father of the "locus of control" construct Julian Rotter assumed a single underlying factor, perceived control is actually a multidimensional construct. Graham referred to a key study by Gurin, Gurin, Lao, and Beattie (1969) in which locus of control scores for over 1500 African American college students were factor analyzed, revealing two distinct dimensions, referred to as "personal control" and "control ideology." While *personal control* reflected perception of how much control one personally possesses, *control ideology* reflected how much control one feels that individuals have in general. As in this dissertation, the study showed that highly internal scores on the general form of control did *not* predict better outcomes, but that higher scores on the more personal form of control did. The multidimensional (personal versus general) nature of perceived control was then replicated in a series of other studies of how perceived control relates to achievement (e.g., Lao, 1970; Jorgensen, 1976), sometimes with the personal control items worded in first person form and the ideological, general control items worded in third person form. In each of these studies, achievement was positively associated with higher scores on the personal control dimension, but not with higher scores on the control ideology dimension.

These findings about personal versus ideological forms of control were again replicated in 1990 by sociologist Roslyn Arlin Mickelson. Mickelson demonstrated that both Black and White high school students of both middle- and low-SES groups

possessed two types of attitudes toward education: concrete attitudes and abstract attitudes. Highly positive *concrete* attitudes reflected beliefs rooted in life experience that education has led to personal success; highly positive *abstract* attitudes reflected an ideological belief in the American Dream—the philosophical notion that education is the key to success. While Mickelson's article focused on attitudes (positive or negative evaluations) toward education rather than perceived control, Mickelson explicitly stated the similarity:

> Readers will recognize the similarities between Rotter's (1975) generalized expectancy measure "locus of control" (see also, Lefcourt 1976; Phares 1976) and this article's conceptualization of concrete and abstract attitudes. . . . [W]ork in this area suggests that control is not only domain specific but that it exists on both the personal and the abstract levels. . . . The general level refers to beliefs about how the world operates, while the personal level refers to beliefs about how the specifics of the individual's life seem to be working. People can be internal on one level and external on the other; Gurin and her associates found black college students to be highly internal on the *general control ideology* (cultural beliefs rooted in the Protestant ethic) but external on the *personal control* level. . . . It may be useful to view abstract and concrete attitudes toward education as domain-specific (education and opportunity) measures of both personal and general locus of control. The abstract beliefs are comparable to a domain-specific "control ideology" measure, whereas concrete beliefs are comparable to a domain-specific "personal control" measure. (pp. 47, 48, italics in original)

Akin with the control researchers of the 1960s and 1970s, Mickelson found that concrete attitudes toward education predicted academic success, but that abstract attitudes were unrelated to academic success.

This dissertation replicates and extends the findings of these previous studies in several ways. First, this dissertation replicated the finding that people of multiple social groups possess both concrete and abstract control beliefs. Similar to Mickelson (1990), I found that the perceived control construct differentiated into recent (concrete) and trait

(abstract) types for members of various social groups and not for African Americans only.

Second, this dissertation replicated the suggestion of these previous studies that SES is positively related to *concrete* control beliefs (with higher-SES youth experiencing control more frequently in their day-to-day lives) yet negatively related to *abstract* control beliefs (with lower-SES people theorized by some to hold a deeper faith in the American Dream ideology; see Mickelson, 1984, 1990; Ogbu, 1978; Patchen, 1982; Sleeter & Grant, 1987; Crichlow, 1986). Since those with lower scores on recent (concrete) perceived control are thought to have higher scores on trait (abstract) perceived control, it is not surprising that the two types of perceived control found in this dissertation were negatively correlated for all social groups. It is notable, though, that these negative correlations persisted even when aspects of SES were in the model, or statistically controlled. This suggests that there may be explanations other than SES for the negative correlation between these variables, presenting an area for future inquiry.

Third, this dissertation replicated the finding that the concrete but not the abstract form of perceived control is predictive of positive outcomes. In other words, day-to-day, actual control experiences matter, but abstract ideological beliefs do not. Importantly, this dissertation extended this finding from the domain of academic achievement to the domain of health. Apparently, concrete control beliefs matter in predicting health, just as they matter in predicting academic achievement; likewise, abstract control beliefs do *not* matter in predicting health, just as they do not matter in predicting academic achievement. This is a disappointing finding for researchers concerned with improving

the health of low-SES youth because it implies that simply encouraging an ideological belief in personal control is not enough to improve health outcomes. Only by encouraging youth to exercise the control that they perceive having in their actual, day-day-experiences can their health outcomes be improved. Yet, for low-SES youth, these control experiences may be limited.

In sum, the variables used in this dissertation possessed certain strengths, weaknesses, and complexities that must be kept in mind in understanding the meaning of the various models that were estimated. All constructs were measured with self-report items, leaving the opportunity for biased responses. Further, for no construct in the model was there support for measurement invariance across social groups, which impedes direct comparison across groups of the effects of one construct on another. Finally, two perceived control constructs emerged from the data, though only one had been hypothesized; yet, this result is defensible in light of prior literature.

Findings in the Relationship among Aspects of SES

In this dissertation, I found that traditional aspects of SES (occupational rank, educational attainment, and financial resources) were significantly and positively related to one another. This was expected, since higher levels of education beget better jobs that yield greater income (Mirowsky & Ross, 2003). Financial resources consistently had the greatest effects on all of the psychological mediators across all participants, with higher levels of financial resources associated with lower levels of financial stain, higher levels of perceived SES, more frequent feelings of control in the past 30 days, and lower levels of trait control. Educational attainment had smaller but significant effects on the

mediators, all in the same direction as the effects of financial resources, as expected. In contrast, occupational rank had no effects on any of the psychological mediators.

It is not surprising that participants with higher levels of financial resources and educational attainment reported less financial strain (Price et al., 2002; Gutman & Eccles, 1999), higher levels of perceived SES, and higher levels of recent control (Bruce & Thornton, 2004), as these findings concur with previous literature. However, the zero effects of occupational rank on any of the mediators is surprising and interesting because literature suggests that better jobs should, at least, be associated with higher levels of perceived control. Literature has shown that better jobs typically give workers more control over job conditions (including safety) and greater ability to choose tasks that are novel and challenging, rather than repetitive (APA, 2007; Karasek & Theorell, 1990; Marmot et al., 1997; Adler & Snibbe, 2003). Additionally, we know that low-status occupations generally combine high demands with low levels of control, which induces greater job strain, also known as occupational stress (Matthews et al., 2010). As such, a positive relationship between occupational rank and recent experiences of control was expected.

One reason for the zero relationship between occupational rank and any of the psychological mediators is that the models have controlled for educational attainment and financial resources in estimating these effects. It could be that among young adults, occupational rank has little effect on financial strain, perceived SES, and perceived control after accounting for educational attainment and financial resources, which were highly correlated with the occupational rank scores. Another reason for the zero

relationship between occupational rank and the psychological mediators is the age of the sample. Participants were 28.65 years old on average, with a range from 24.33 years to 33.92 years. At this age, it is probable that most participants have not yet taken on a high-status job. Among those participants who reported working at Wave IV, the most frequently-named occupations included working as a manager, a cashier, or a retail or service sales representative. Those participants who will take on higher-status jobs later in life may in fact be students at Wave IV (for example, enrolled in medical school or law school, preparing for the high-status jobs that they will hold in the future as doctors and lawyers), or only be at the beginning stages of their careers. According to Mirowsky and Ross (2003), young adults who pursue postgraduate education displace immediate payoff for their efforts until they receive their additional degree. If the effects of occupational rank on financial strain, perceived SES, and perceived control were measured several years after the Wave IV data collection, perhaps in a future wave of Add Health data, it could be that occupational rank would have stronger effects on the psychological mediators that link SES with health.

It was also notable that in all structural models of the relationships of occupational rank, educational attainment, and financial resources with trait-type control, those with *lower* levels of educational attainment and financial resources tended to have *higher* levels of trait-type control, marking negative relationships. This is in contrast to the associations of educational attainment and financial resources with recent (or state) experiences of control, which were positive. This finding is congruent with research that has shown a contrast between the ideological control beliefs and actual, tangible control

experiences of low-SES youth in the U.S. Specifically, as previously mentioned, many researchers have demonstrated that low-SES youth often have a strong abstract, ideological sense of control, but have less day-to-day, concrete experiences of actual control in their lives (e.g., Gurin, Gurin, Lao, & Beattie, 1969; Lao, 1970; Jorgensen, 1976; Mickelson, 1990; see Graham, 1994). This discrepancy has been referred to as a "paradox" in previous sociological literature (Mickelson, 1990).

Many results about the relationships among aspects of SES held across social groups, with a few notable exceptions. Traditional aspects of SES (occupational rank, educational attainment, and financial resources) were significantly and positively correlated among all social groups. This finding contrasts with some research suggesting that traditional measures of SES have weak relationships among African Americans, who experience discrimination in pay when working the same level job as Caucasian Americans (Chen et al., 2004). Financial resources also generally had the strongest effects on the psychological mediators across all social groups, with effects in the same direction as in models estimated across all participants. As in models estimated across all participants, occupational rank had very few effects on the psychological mediators.

Interesting differences emerged with regard to the effects of educational attainment on the psychological mediators and on health. It was for White men and White women only that educational attainment had a consistent, negative effect on financial strain, and a consistent, positive effect on perceived SES and recent experiences of control. Educational attainment also had a strong, significant effect on perceived SES among Black women. The effects of educational attainment on financial strain, perceived

SES, and recent experiences of control were nonsignificant in most of the models estimated among Black men, Latino men, and Latina women.

Educational attainment's strong, positive effect on perceived SES among Black women is not surprising. Many researchers have highlighted the esteem placed on education among African Americans (e.g., Bruce & Thornton, 2004; Mickelson, 1990; Ogbu, 1978), so it is intuitive that Black women in Add Health with higher levels of education judge themselves to be higher-status than those around them with perceivably lower levels of SES. According to Mickelson (1990), middle-class Black women receive the best returns on higher education among any Black cohort, and this is reflected in their perceptions of education.

It is more surprising that the associations between education and the psychological mediators, and health did *not* for Black men, Latino men, and Latina women. Part of the problem in finding significant effects for Black and Latino men is that the models had questionable fit, according to at least some fit indices, for these groups. This tells that the conceptualization of the SES-health models used in this dissertation are not ideal for all ethnic groups. Future work can explore how the models can more accurately reflect SES-health processes for these groups. One potential way to improve the models is to incorporate "credentialing" effects—such as the effect of having a high school degree versus not, or the effect of having a college degree versus not. According to forthcoming research by Montez et al. (in press), stepwise "credentialing" effects are particularly important in modeling SES-health processes among African Americans in particular.

Findings in the Relationship between Aspects of SES and Health

In terms of direct effects of aspects of SES on health among all participants, educational attainment was the only traditional component of SES to have consistent, significant direct effects on health, with higher levels of education associated with better health—even when controlling for occupational rank and financial resources. This finding is consistent with literature stating that education benefits health not only by yielding better jobs and higher income, but through less obvious mechanisms, such as accumulation of tacit knowledge about managing time and money, and access to expanded and more valuable social networks (Mirowsky & Ross, 2003). This effect was robust, remaining strong and significant even when controlling for IQ and parents' level of education in analyses for Research Question 7. When models were run for separate social groups, the positive effect of educational attainment on self-rated health was strongest for White men, White women, and Black women. Future research might investigate whether these groups have greater access to the benefits named by Mirowski and Ross (2003)—for example, whether White men, White women, and Black women who pursue higher levels of education tend to utilize social networks (such as sororities or other school-based organizations) that instill healthy behaviors.

Estimates of the direct effects of financial resources on health, on the other hand, were not consistent across the models. For example, in analyses for Research Question 5, in which the model was run across all social groups combined, I found that financial resources had a significant, positive direct effect on health in the exploratory sample, but no significant effect in the cross-validation sample. This inconsistency can be due to

chance differences in scores on the variables between the exploratory and cross-validation halves. Note that whenever a direct effect of financial resources on health was found (e.g., in the exploratory sample for Research Question 5), its effect was small in absolute size, so differences between models are not drastic.

Interestingly, the positive direct effect of financial resources on health *did* differ by social group, with White women the only group to experience significantly better health as a direct result of higher levels of financial resources. This effect was medium in effect size, rather than small, as found in some models estimated across all participants. It is important to remember, however, that the Financial Resources construct does not have the same meaning across groups, since support for measurement invariance across social groups was *not* found. For example, for White men, the strongest indicator of financial resources was personal earnings item (λ = .68), whereas for White women, the strongest indicator was household income item (λ = .90), with the loading of the personal earnings item much lower (λ = .22). As such, the positive direct effect of financial resources on health for White women might be more related to their husband or partner's income than their own.

The effect of occupational rank on health was nonsignificant, similar to the zero effects of occupational rank on the psychological mediators. This finding did not differ by social group. Again note that if analyses were performed with a future wave of Add Health data, when some participants will have begun to take on higher-status roles in their careers, stronger effects of occupational rank on health may appear.

Among the direct effects of psychological variables on health, the strongest were those from perceived SES and recent experiences of control, both of which had significant, positive direct effects on health—even controlling for occupational rank, educational attainment, and financial resources. That perceived SES affected health above and beyond more objective indicators of SES (occupational rank, educational attainment, and financial resources) is consistent with previous research. For example, Goodman et al. (2001) found that among young adults in the U.S., subjective SES has significant effects on obesity and depression, independent of education and income (Goodman et al., 2001; see also Adler et al., 2000; APA, 2007). The positive impact of higher levels of recent control on health even controlling for aspects of SES is also consistent with previous findings showing that higher levels of control reduce the gradient between SES and health (Adler & Snibbe, 2003; Bosma et al., 1999; Bosma et al., 2005; Schnittker et al., 2004; Lachman and Weaver, 1998).

Trait-type control, on the other hand, had virtually no direct effect on health. That health was benefited by higher levels of recent experiences of control, but *not* by higher levels of trait-like control, is also consistent with prior research. It has been shown that abstract, ideological control beliefs are not useful in predicting better outcomes; only concrete experiences of control are helpful (Gurin et al., 1969; Lao, 1970; Jorgensen, 1976; Mickelson, 1990). Financial strain had a negligible to small negative effect on health across the models. While this effect was small, it was in the expected direction.

Direct effects of the psychological variables on health did differ by social group. Black women were the only participants who, as a whole, experienced significant

positive benefits on their health from higher scores on the MacArthur Social Ladder. Note, however, that this effect was small in absolute size. Additionally, White men, White women, and Latina women were the only groups that experienced better health as a result of more frequent experiences of recent control. Why perceived SES and recent control seem to play different roles in SES-health processes among various social groups is an open question. For example, it is not clear why Black women benefit from higher social comparisons with others, rather than greater frequency of perceived control.

Mediating Paths

Since educational attainment and financial resources significantly affected the psychological variables, and two of the psychological variables (perceived SES and recent control) significantly affected health, this introduced several indirect pathways by which objective indicators of SES affect health. This is a valuable contribution to the SES-health literature because several researchers have indicated that while the link between SES and health is well-established, it is a "mystery" *how* these effects occur (Angell, 1993), but that it is thought that effects of SES on health occur not just through poverty or lack of health care but through psychosocial mediators (Adler et al., 1994; Adler & Snibbe, 2003; Kaplan and Lynch, 1997; Matthews et al., 2010). Moreover, since I have run models separately by social group, I have contributed information not just about the mediating processes by which SES affects health generally, but how these processes uniquely operate among gender and racial/ethnic subgroups. For example, Bruce & Thornton (2004) demonstrated that different social groups garner a sense of perceived control from different social factors in their lives (e.g., education vs. income

vs. social support). Similarly, Price et al. (2002) argued that populations may adapt differently to economic deprivation, and that perhaps not all populations experience financial strain in the form of worry or emotional pain.

Specific indirect paths that I found in models run across all participants were the paths from educational attainment and financial resources on health through perceived SES and experiences of recent control. The strongest indirect path was that from financial resources to recent control to health, $b^* = .09$, $p < .001$ (as calculated by Mplus), which is similar in size to the *direct* path from financial resources to health in same sample (the cross-validation sample), $b^* = 12$, $p < .01$. That the indirect effect of financial resources on health through recent control was about as large as the direct effect is notable because it lends credence to the statement of researchers that SES affects health not just through poverty but through psychosocial mechanisms (Angell, 1993; Adler et al., 1994; Adler & Snibbe, 2003; Kaplan and Lynch, 1997; Matthews et al., 2010).

The significance of these indirect paths differed by social group. Two of the four mediating paths held for White men and for White women—but different psychological mediators were at play for these groups. Among the paths from educational attainment and financial resources to health, only the effects through perceived SES were significant for White men, and only the effects through recent control were significant for White women. This may mean that social comparisons of SES are more meaningful for White men than for White women, perhaps because higher status in society contributes a sense of masculinity to White men. Other trend-level indirect effects were found for White women and for Black women. For Black women, the only indirect effects found were

trend-level effects of educational attainment and financial resources on health through perceived SES, similar to White men. No significant or trend-level indirect effects were found for Black men, Latino men, or Latina women. Better-fitting models of SES and health for Black men and Latino men to be constructed in future stages of this research may provide clearer insight about the mechanisms by which SES affect health for these groups.

Potential Confounding Variables

An important step in providing support for the validity of the results of this dissertation was to account for potential confounding variables in the relationships between aspects of SES and health. In an additional model run across all participants in the cross-validation sample, I controlled for IQ, which has been shown in prior literature to be a common cause of both SES (e.g., Huston et al., 1977) and health (e.g., Hart et al., 2003; Gottfredson & Deary, 2004; Gottfredson, 2004). In my results, I found that IQ was not a common cause. While IQ had positive and significant associations with occupational rank, educational attainment, and financial resources, it had no significant direct effect on health. Additionally, adding IQ to the model did not eliminate or otherwise change the direct and indirect effects of aspects of SES on health found in previous models. In this sense, inclusion or exclusion of IQ in models of SES-health processes, at least as conceptualized here, has little bearing on the estimates produced by the models.

Aside from confirming that higher IQs are associated with better jobs, higher levels of education, and greater financial resources among Add Health participants, the

addition of IQ to the model revealed other interesting findings. Namely, lower IQs were directly associated with higher levels of perceived SES and higher levels of trait-like control. This means that lower IQs instill a higher sense of one's socioeconomic standing compared to others, and higher levels of an ideological sense of control in one's life. These findings seem to imply that lower IQs are associated with less awareness about the realities of one's socioeconomic standing and of the control one has over life outcomes. Additionally, adding IQ to the model introduced longer chains of indirect effects. These longer chains of effects were those from IQ to educational attainment and financial resources, from these variables to perceived SES and perceived control, and from these variables to health. Though these paths were all small in effect size, discovering these detailed pathways is an important start for unraveling the "mystery" of *how* lower SES leads to poorer health (e.g., Angell, 1993; Matthews et al., 2010).

While IQ did not appear to confound the relationship between SES and health, a different confounding variable emerged in the results: childhood SES. In two additional models run across all participants in the cross-validation sample, I separately tested for effects of interactions between aspects of parental respondents' SES and aspects of the SES of the main respondent. In a first model, I considered interactions focusing on educational attainment, adding parental education as a main effect, as well as an interaction term between parents' educational attainment and the education attained by the main respondent (by young adulthood). In a second model, I considered interactions focusing on financial resources, adding family income to needs ratio as a main effect, as well as an interaction term between family income to needs ratio reported by the parental

respondent at Wave I and the household income reported by the main respondent at Wave IV. Recall from Chapter 2 that a family income to needs ratio is a measure of depth of poverty calculated by dividing self-reported household income in a given year by the poverty cutoff set by the U.S. Department of Health and Human Services for a given year and a given family size (Huston et al., 1994), with values below 1.0 indicating inability of a family to meet its basic needs. While the second model (with this family income to needs ratio term) had very poor fit to the data, the first model (with the parental education term) had a more reasonable fit.

The model in which I added parental educational attainment as a main effect, and parental education attainment multiplied by young adulthood educational attainment in an interaction effect, revealed several interesting results. First, I found that participants whose parents had higher levels of education had achieved better jobs, reached higher levels of education themselves, and had greater financial resources by Wave IV. They also had higher levels of perceived control and better health. These effects of parental educational attainment on perceived SES and health were direct, rather than simply reflecting the impact of parental educational attainment on occupational rank, educational attainment, and financial resources. Because parental educational attainment predicted both aspects of SES and health, it was shown to be a common cause.

Next, adding parental educational attainment to the model revealed additional, longer chains of indirect effects in the model. The strongest of these new indirect effects was a highly significant effect of parental educational attainment on health through young adulthood financial resources. New indirect effects were of small effect size, but are

important in shedding light on the "mystery" of how SES affects health (e.g., Angell, 1993; Matthews et al., 2010).

Additionally, not only was parental educational attainment a common cause of both aspects of SES and health, but the parental educational attainment by young adulthood educational attainment interaction term had significant effects on four of the endogenous variables in the model—three of the psychological mediators, along with the final outcome of health. Probing the effect of the interaction term on health revealed that young adults with higher levels of education had higher average self-reported health scores, and that higher levels of parental SES made an independent, positive effect on self-rated health. It also appeared that participants whose parents had very high levels of education (professional training beyond college) but who were low achievers themselves (high school degree or less) had considerably poorer health than would be expected for someone of their SES background. This finding makes sense because it could be that poor health has kept these young adults from achieving a level of education on par with that of their parents. In other words, poor health can be a cause or reason for their low educational achievement, rather than an effect.

As a whole, these findings indicate that the process by which educational attainment affects health among young adults is *not* the same for young adults of various childhood SES backgrounds (as measured indicated by parents' educational attainment). To account for these findings, future models of the SES-health relationship among young adults might be estimated separately for young adults of various childhood SES

backgrounds, and also control for childhood SES as a main effect. Doing so will lend validity to estimates of the effects of aspects of SES on health for this age group.

Interventions in the Link Between Low SES and Poorer Health

As stated, one important reason for determining the mediating mechanisms between SES and health is to reveal potential points of intervention and screening (Taylor et al., 1997). If it is possible to break or attenuate the links between lower SES and health, then it would be worthwhile for researchers who are concerned with the health of lower-SES members of society to pursue this avenue of work. Several interventions intended to improve the outcomes of low-SES individuals have already been proposed. Because this dissertation has clarified the direct and indirect relationships among occupational rank, educational attainment, financial resources, the psychological mediators, and health, we now have some insight as to how fruitful these interventions would be if implemented through public policy.

Obviously, one way to improve the health of lower-SES individuals would be to improve these individuals' occupational rank, level of educational attainment, and financial resources. For example, improved public transportation can make it easier for low-SES individuals to search for good jobs and travel to these jobs on a daily basis. Unfortunately, improving public transportation to better jobs is a task which is more difficult for some states and regions in the U.S. than others (Matthews et al., 2010), and given the lack of direct and indirect effects of occupational rank on health found in this dissertation, it is doubtful that improved occupational rank, in itself, would have much effect on the health of young adults. Other suggested interventions have centered upon

encouraging low-SES individuals to pursue additional education by offering these individuals educational grants and counseling about educational loans and applications, and about alternatives such as online education (Matthews et al., 2010).

Additionally, other interventions for improving the health outcomes of low SES individuals have centered upon encouraging families with lower levels of income to limit the number of children in their family. According to Mirowsky and Ross (2003), risk of economic hardship is strongly influenced by two aspects of household composition: (a) having dependent children in the household and (b) not being married. In the words of Mirowsky and Ross, "dependent children increase economic hardship because they *are* dependent" (p. 81). That is, children require food, clothing, shelter, medical care, supervision, and school supplies. In a one-parent household, the parent—typically the mother—not only is the sole breadwinner, but work-family strains also tend to reduce earnings, hamper job performance, and slow the rate at which pay increases (Mirowsky & Ross, 2003). If young adults were to have fewer children, and perhaps fewer children out of wedlock, then household income would be higher and family needs would be lower. These families would most likely experience direct and indirect benefits of these higher levels of household income, relative to family needs, on their health.

Another possible intervention for improving the health outcomes of low-SES individuals is to improve these individuals' IQ. By giving low-SES individual greater cognitive skills, they will possibly go further in school and be rewarded with more money, greater perceived control, greater perceived SES, and better resulting health. Some researchers investigated this possibility in experimental manipulations of low-

income children's home environments (e.g., Gray & Klaus, 1970; Seitz & Apfel, 1994). Some of these manipulations involved home visitation programs from professional staff, which resulted in some improvement in parents' stimulation of their infants (Olds & Kitzman, 1993). Many of these experimental manipulations of the home environment produced significant improvements in subsequent school adjustment and performance for target children as well as for later-born children who were not directly part of the intervention.

Other experimental studies, including the Consortium for Longitudinal Studies and the Carolina Abecedarian Project, have attempted to increase IQ by providing preschool educational and social services to some families. Results from the Consortium showed that early educational interventions decreased grade retention and increased high school graduation rates (Royce, Darlington, & Murray, 1983). One Consortium study showed that at age 27, program participants had higher levels of educational attainment than controls, and that program females, compared to control females, were less likely to be receiving public welfare assistance (26% vs. 59%), more likely to be employed (80% vs. 55%), and had higher personal earnings (Schweinhart, Barnes, & Weikert, 1993). Results from the Carolina Abecedarian Project showed similarly long-lasting effects, with recipients of early childhood interventions, compared to controls, showing less grade retention (31% vs. 55%) and less assignment to special education (25% vs. 48%; Campbell & Ramey, 1994, 1995). The idea that increasing IQ will result in better health outcomes is supported by results from Research Question 7a of this dissertation. Here we saw that higher IQs were associated with higher occupational rank, educational

attainment, and financial resources by young adulthood, which in turn positively affect perceived control, perceived SES, and health.

Thus far, all mentioned interventions for improving the health status of low-SES individuals have discussed doing this by, ironically, raising levels of occupational rank, educational attainment, and financial resources —so that low-SES participants' SES is not as low. A different avenue for promoting health among these individuals would be to improve their scores on the psychological variables that are tied with health. For example, interventions could aim to change low-SES children's interpretation of their SES such that interpretations are not physiologically and psychologically detrimental. According to Chen et al., (2004), future studies should assess whether certain points in childhood serve as critical periods for the development of these interpretation styles—periods when interpretations of SES become ingrained and influence health outcomes.

Interventions can also encourage low-SES young adults to focus on the aspects of their lives that they do have some control over—such as choices to focus on school, avoid unwanted pregnancy, exercise daily, and eat healthy foods. Results from this dissertation show that higher levels of recent control experiences increase health, but mere ideological beliefs of control do not. To the extent that encouraging youth to exercise agency with regard to the changeable aspects of their lives increases recent control experiences, and not just ideological beliefs, this intervention strategy should result in better health.

An important contribution of this dissertation is the knowledge that potential effectiveness of interventions will likely differ by social group. Huston et al. stated in

1994, “Given the long-standing interest in intervention, there are surprisingly few advances in understanding what interventions are most effective, for whom, and why” (p. 281). This dissertation addressed this gap by showing, for example, that for low-income White men and women, increasing levels of education should significantly increase health both directly and indirectly (through increased experiences of recent control). Among low-income Black women, increasing levels of education should increase health directly and indirectly (through increased perceived SES). For Black men and Latino/a men and women, attempting to increase levels of health by increasing levels of education does not seem to be a worthwhile intervention strategy. This is not to say that education is not important for these groups, but that increasing education may not directly or indirectly improve health for members of these groups; yet higher levels of education may improve outcomes on other valuable domains of life.

Additionally, instead of attempting to correct the negative effects of low SES on health in the U.S., policymakers can attempt to reduce SES disparities. Huston et al. critiqued in 1994 that interventions continue to focus on changing the child or the family, without directly addressing poverty itself, which they name as the root of the problem. Compared with other industrialized countries, the income of the top 10% of earners in the country is higher and the income of the bottom 10% is lower, such that the U.S. has a larger income gap (APA 2007), with rates of inequalities continually increasing (Chevan & Stokes, 2000). Research shows that income inequality in a given area is associated with higher mortality rates, even when controlling for income (Adler & Snibbe, 2003). Researchers have both material and psychological explanations for this effect. Materially,

unequal distribution of income is associated with underinvestment in infrastructure, while psychologically, unequal distribution of income leads to heightened social anxiety and diminished social trust. In trying to improve relative health in the U.S., policymakers can address the fact that our nation's underlying socioeconomic structure contributes to its steep SES-health gradient (Adler, Marmot, McEwen, & Stewart, 1999).

Limitations

Despite the strength of the data used in this dissertation, this dissertation also had several limitations. As mentioned, the data were entirely self-reported, which introduced potential for biased responses. For example, response styles on a self-rated health item may differ dramatically by culture, which was not taken into account in this dissertation. Cultures that emphasize modesty and de-emphasize differences with others may be more likely to select a midpoint on the scale than the extremes values on the scale (Heine, Lehman, Peng, & Greenholtz, 2002). Likewise, some participants may be unsure of where they stand on certain SES and health scales—for example, if they have not been to the doctor recently to check up on a potential health problem, or do not keep track of how much money they make in a given year. Measurements reported by persons or institutions other than young adults themselves (such as government documents of income reported on annual tax forms, or diagnoses given by doctors) may present less bias.

A second limitation is that models were limited to linear effects of variables on each other. In actuality, the effects of aspects of SES on psychological variables and on health may be quadratic, cubic, or in some other form. For example, nonlinear effects of SES on health have been seen for income, with increases in income having the greatest

effects on health for those at the lowest levels of the income distribution (Mirowsky & Ross, 2003). For example, moving up from the lowest levels of family income results in a large improvement in health, but beyond the $40,000 marker (at around the 65th percentile of the family income distribution in Mirowsky and Ross' data), increasing levels of income has virtually no identifiable positive effect on health. In future research, the relationship between SES and health might be examined for different portions of the x-axis (representing income or SES) using quadratic spline models, or through introducing interaction terms into SEM models to represent the curvilinear component of the effect of SES on health.

A last important limitation of this dissertation is that results of models for Black and Latino men should be interpreted very cautiously, as the structural models predicting health for these groups did not have reasonable fit according to all fit indices. It is possible that using other forms of the variables in the model would create more meaningful models for these groups. For example, recent literature has highlighted how important credentialing is in predicting health among U.S. ethnic minority groups (Montez et al., in press). That is, it has been shown that receipt of credentials such as a high school degree or a college degree (measured in 0/1 dichotomous form) have a powerful impact on mortality for these groups. In fact, these authors stated that the credentialing effect was a stronger predictor of mortality than were incremental years of education. Altering the education variable for Black and Latino men to reflect receipt of important educational degrees may be one way to improve fit of the model to data, and depict more accurately the reality of the SES-health process for these groups.

Future Directions

There are several avenues for future development of the ideas explored in this dissertation. First, the models can be tested using more specific, clinical health outcomes such as allostatic load, diabetes, or high blood pressure. Results of these models may differ depending on the specific health outcome being studied. For example, Montez et al. (in press) demonstrated a relationship between SES and mortality, yet other research has shown that SES does *not* impact rates of asthma, and there are inconsistent findings of the relationships between SES and rates of suicide and STDs (Bradley & Corwyn, 2002).

Future research should also probe even further into the psychological mechanisms that mediate the impact of SES and health. According to Keith (2006), an infinite number of mediators can be placed between a cause and an effect in a structural equation model, with mediators adding specificity about *how* an effect occurs. For example, results from this dissertation showed that for White men and women, higher levels of education and income affected self-rated health through the mediators of perceived SES and perceived control. A next logical step would be to identify the specific behaviors that are influenced by higher levels of perceived SES and perceived control—such as higher rates of daily exercise, lower rates of smoking, or lower rates of risky sexual activity—which, in turn, may result in better overall health for young adults. Adding additional mediators to these pathways would not change results, but would simply help researchers understand how the effect of SES on health occurs, unraveling the "mystery" behind this effect.

Future research should also consider contextual effects in the influence of SES on health by introducing HLM techniques that nest individuals within their neighborhoods.

These analyses can highlight the extent to which the SES-health relationship in the U.S. can be attributed to between-neighborhood differences—such as differences in local employment rates, quality of schools, cost of living, or urbanicity—compared to within-neighborhood differences, such as individual differences in effort. Research suggests that contextual effects in the relationship between SES and health are important to consider. For example, concentration of poverty at the community level is associated with poorer behavioral and emotional health outcomes (Leventhal & Brooks-Gunn, 2000; Wasserman et al., 1988). Additionally, research has shown that the pathways by which SES affects health are likely to differ for urban versus rural communities; in urban environments, the impact of SES on health is thought to take place through crowding and stress levels, yet in rural environments, the effect is thought to take place through lack of educational and health care access, social isolation, and understimulation (APA 2007; Saegert & Evans, 2003).

In future research, longitudinal models investigating the reciprocal effects of SES, health, and psychological variables over time should be constructed. For example, a panel model might be estimated to provide insight about how higher SES leads to higher levels of perceived control, which leads to better health; better health, then, over time can cause higher levels of perceived control, which may lead to higher levels of income. Such paths have already been suggested in the literature. For example, Price et al. (2002) discussed the idea that employment "causes" good emotional and mental health, and loss of employment often results in poorer emotional and mental health. This poorer emotional and mental health can, in turn, reduce access to opportunities for reemployment.

Likewise, Mirowsky & Ross (2003) have stated that while low-status jobs are more likely to be hazardous and to cause injury, disability can result in lower likelihood to be employed, again highlighting the bidirectional effects of SES and health.

Finally, additional lines of research should test the effectiveness of the intervention strategies mentioned in this dissertation for their ability to improve health among young adults. Interventions involving improving young adults' socioeconomic conditions would be costly and take years to observe, but could perhaps be introduced on a small scale. For example, providing educational grants to encourage low-SES individuals return to school, if implemented on a national level, would require that such a bill be passed by the government—but a research study with appropriate funding or partnership with certain colleges or universities could introduce such a program at a small scale, and track progress of participating individuals over time. Other interventions that involve personal decisions, such restricting the number of children that families should have, may be less realistic to implement—or, at best, highly controversial. Perhaps the most realistic point of intervention is at the level of psychological variables and health behaviors. That is, interventions could focus on encouraging control over the more changeable day-to-day habits in the lives of low-SES young adults that will, over time, contribute to better health stocks (Mirowsky & Ross, 2003).

Conclusion

In summary, this dissertation made several contributions to the state of research on the association between lower SES and poorer health. Models included not only traditional aspects of SES (occupation, education, and income), but psychological aspects

of SES (financial strain and perceived SES), as well as the related yet distinct concept of perceived control. In estimating measurement and structural models separately by social group, I acknowledged and re-affirmed that SES does not mean the same thing for all people; nor do aspects of SES relate to each other or predict health equally for all groups. Further, I identified several mediating pathways that provide grounds for potential interventions to break or attenuate the association of lower SES with poorer health. I also examined the robustness of my results to potential confounding variables, IQ and childhood SES. Young adulthood is an ideal time in the life course for this investigation, and for interventions, because it is a time when one's health is one's own responsibility. The relationships among aspects of SES and health found in this dissertation present knowledge about possible ways to prevent poor health or promote better health, prior to middle and older adulthood, when there may be less opportunity for change in one's SES and health trajectory.

Appendix

Items Used in Measurement, Structural, and Predictive Models: Full Wording, Response Options, and Recodes

Construct	Add Health Item(s) used in Construction of Variable/Factor	Description / Full Item Wording	Response options, once items marked "r" are rersed	Recode
Sex	BIO_SEX3	Interviewer's confirmation of respondent's sex. Interviewer was instructed to ask if necessary.	1 = male 2 = female	0 = male 1 = female
Race/Ethnicity	H3OD2	Are you of Hispanic or Latino origin?	Self-report of being Hispanic/Latino, 0 (no), 1 (yes)	
	H3OD4A	What is your race?	Self-report of being White, 0 (no), 1 (yes)	
	H3OD4B	What is your race?	Self-report of being Black/Af Amer, 0 (no), 1 (yes)	
	H3OD4C	What is your race?	Self-report of being Amer Indian/ Native American, 0 (no), 1 (yes)	
	H3OD4D	What is your race?	Self-report of being Asian/Pac Islander, 0 (no), 1 (yes)	
Young Adulthood Occupational Rank (most recent job)	H4LM19	How many hours a week (do/did) you usually work at this job?	Responses range from 10 hours to 168 hours. If respondent reported working over 80, an	

			additional soft check was made to confirm the number of hours	
	H4LM21A	Does/Did your employer make the following available to you: health insurance?	0 (no), 1 (yes)	
	H4LM21B	Does/Did your employer make the following available to you: retirement benefits (such as 401k, 403b, or a company pension plan)?	0 (no), 1 (yes)	
	H4LM21C	Does/Did your employer make the following available to you: paid vacation or sick leave?	0 (no), 1 (yes)	
	H4LM22	In your current primary job, do you spend most of your time…	1 = standing, doing hard physical work, for example, doing construction work 2 = standing, doing moderate physical work, for example, nursing or being a mechanic 3 = standing, doing light physical work, for example, standing at a counter, teaching, or working at a conveyer belt 4 = seated, for	Delete cases with a "5"

			example, using a computer or driving 5 = mixed answers	
	H4LM23	Overall, how often (do/did) you have the freedom to make important decisions about what you (do/did) at work and how you (do/did) it?	0 = none or almost none of the time 1 = some of the time 2 = most of the time 3 = all or almost all of the time	
	H4LM24 (r)	How much of the time (do/did) you do the same things repeatedly, that is over and over?	0 = none or almost none of the time 1 = some of the time 2 = most of the time 3 = all or almost all of the time	
	H4LM25	Thinking about your official job duties, which of the following statements best describes your supervisory responsibilities at your (current/most recent) primary job?	1 = I supervise/supervised other employees 2 = I supervise/supervised other employees, some of whom supervise/supervised others 3 = I do/did not supervise anyone	1 = I do/did not supervise anyone 2 = I supervise/supervised other employees 3 = I supervise/supervised other employees, some of whom supervise/supervised others
	H4LM26	How satisfied (are/were) you with this job, as a whole?	1 = extremely satisfied 2 = satisfied 3 = neither satisfied nor dissatisfied	

			4 = dissatisfied 5 = extremely dissatisfied	
	H4LM27	Which one of the following best describes your (current/most recent) primary job?	1 = it is part of my long-term career or work goals 2 = it is preparation for my long-term career or work goals 3 = it is not related to my long-term career or work goals 4 = I do not have a long-term career or work goals	0 = I do not have a long-term career or work goals 1 = it is not related to my long-term career or work goals 2 = it is preparation for my long-term career or work goals 3 = it is part of my long-term career or work goals
Young Adulthood Educational Attainment	H4ED2	What is the highest level of education that you have achieved to date?	1 = 8th grade or less 2 = some high school 3 = high school graduate 4 = some vocational/ technical training (after high school) 5 = completed vocational/technical training (after high school) 6 = some college 7 = completed college (bachelor's degree) 8 = some graduate	

			school 9 = completed a master's degree 10 = some graduate training beyond a master's degree 11 = completed a doctoral degree 12 = some post baccalaureate professional education (e.g., law school, med school, nurse) 13 = completed post baccalaureate professional education (e.g., law school, med school, nurse)
Young Adulthood Financial Resources (in interview year)	H4EC1	Thinking about your income and the income of everyone who lives in your household and contributes to the household budget, what was the total household income before taxes and deductions in {2006/2007/2008}? Include all sources of income, including non-legal sources.	1 = less than $5,000 2 = $5,000 to $9,999 3 = $10,000 to $14,999 4 = $15,000 to $19,999 5 = $20,000 to $24,999 6 = $25,000 to $29,999 7 = $30,000 to $39,999 8 = $40,000 to $49,999 9 = $50,000 to $74,999 10 = $75,000 to $99,999 11 = $100,000 to

			$149,999 12 = $150,000 or more
	H4EC2	Now think about your personal earnings. In {2006/2007/2008}, how much income did you receive from personal earnings before taxes—that is, wages or salaries, including tips, bonuses, and overtime pay, and income from self-employment?	0 = $0 1 = $1 2 = $2 3 = $3 4 = $4 Range from $5-870,000 900000 = $900,000 920000 = $920,000 999995 = $999,995
	H4EC4	Is your house, apartment, or residence owned or being bought by {you and/or your spouse/partner}?	0 = no 1 = yes
	H4EC7	What is your best estimate of the total value of your assets and the assets of everyone who lives in your household and contributes to the household budget? Include all assets, such as bank accounts, retirement plans and stocks. Do not include equity in your home.	1 = less than $5,000 2 = $5,000 to $9,999 3 = $10,000 to $24,999 4 = $25,000 to $49,999 5 = $50,000 to $99,999 6 = $100,000 to $249,999 7 = $250,000 to $499,999 8 = $500,000 to $999,999 9 = $1,000,000 or more
Perceived Control	H4PE37 (r)	There is little I can do to change the important things in my life.	1 = strongly agree 2 = agree 3 = neither agree nor

		disagree 4 = disagree 5 = strongly disagree
H4PE38 (r)	Other people determine most of what I can and cannot do.	1 = strongly agree 2 = agree 3 = neither agree nor disagree 4 = disagree 5 = strongly disagree
H4PE39 (r)	There are many things that interfere with what I want to do.	1 = strongly agree 2 = agree 3 = neither agree nor disagree 4 = disagree 5 = strongly disagree
H4PE40 (r)	I have little control over the things that happen to me.	1 = strongly agree 2 = agree 3 = neither agree nor disagree 4 = disagree 5 = strongly disagree
H4PE41 (r)	There is really no way I can solve the problems I have.	1 = strongly agree 2 = agree 3 = neither agree nor disagree 4 = disagree 5 = strongly disagree
H4MH3 (r)	In the last 30 days, how often have you felt that you were unable to control the important things in	0 = never 1 = almost never 2 = sometimes

		your life?	3 = fairly often 4 = very often
	H4MH4	In the last 30 days, how often have you felt confident in your ability to handle your personal problems?	0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often
	H4MH5	In the last 30 days, how often have you felt that things were going your way?	0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often
	H4MH6 (r)	In the last 30 days, how often have you felt that difficulties were piling up so high that you could not overcome them?	0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often
Perceived SES	H4EC19	Think of this ladder as representing where people stand in the United States. At the top of the ladder (step 10) are the people who have the most money and education, and the most respected jobs. At the bottom of the ladder (step 1) are the people who have the least money and education, and the least respected jobs or no job. Where would you place yourself on this ladder? Pick the number for the step that shows	1 (low) to 10 (high)

		where you think you stand at this time in your life, relative to other people in the United States.	
Financial Strain (past 12 months)	H4EC10	In the past 12 months, was there a time when you {your household}was without phone service because you didn't have enough money?	0 (no), 1 (yes)
	H4EC11	In the past 12 months, was there a time when you (your household): didn't pay the full amount of the rent or mortgage because you didn't have enough money?	0 (no), 1 (yes)
	H4EC12	In the past 12 months, was there a time when you (your household) were evicted from your house or apartment for not paying the rent or mortgage?	0 (no), 1 (yes)
	H4CE13	In the past 12 months, was there a time when you (your household) didn't pay the full amount of a gas, electricity, or oil bill because you didn't have enough money?	0 (no), 1 (yes)
	H4EC14	In the past 12 months, was there a time when you (your household) had the service turned off by the gas or electric company, or the oil company wouldn't deliver, because payments were not made?	0 (no), 1 (yes)

	H4EC15	In the past 12 months, was there a time when you were (your household) was worried whether food would run out before you would get money to buy more?	0 (no), 1 (yes)	
Self-rated Health	H1GH1	In general how is your health?	1 = excellent 2 = very good 3 = good 4 = fair 5 = poor	1 = poor 2 = fair 3 = good 4 = very good 5 = excellent
Family Income to Needs Ratio (Childhood SES)	PA55	About how much total income, before taxes did your family receive in 1994?	Responses range from $0 to $999 thousand.	
	H1HR3A - H1HR3T	Wave I participant's report of household members, recorded after the question: "Please tell me the first names of all the people, other than you yourself, who live in your household. If someone usually lives with you, but is away for a short time, include him or her. At the end of the interview today, the names of these people will be erased from the computer. We need a list now only so we can keep track of people during the interview."	0 to 20 persons	
Parental Education (Childhood SES)	PA12	How far did you go in school?	1 = eighth grade or less 2 = more than 8th grade, but did not graduate from high school	0 = never went to school 1 = eighth grade or less 2 = more than 8th

			3 = went to a business, trade, or vocational school instead of high school 4 = high school graduate 5 = completed a GED 6 = went to a business, trade or vocational school after high school 7 = went to college, but did not graduate 8 = graduated from a college or university 9 = professional training beyond a 4-year college or university 10 = never went to school	grade, but did not graduate from high school 3 = went to a business, trade, or vocational school instead of high school 4 = completed a GED 5 = high school graduate 6 = went to a business, trade or vocational school after high school 7 = went to college, but did not graduate 8 = graduated from a college or university 9 = professional training beyond a 4-year college or university
Cognitive Resources	AH_PVT	Wave I Add Health Picture Vocab Test standardized score	13 to 146	
Weighting Variable	GSWGT4	Post stratified untrimmed longitudinal grand sample weight	26.55 to 16323.66	

Note. The notation "r" signifies that the item was reverse-scored.

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